Progressive Education Society's

Modern College Of Engineering, Pune-05.

1186A, Shivaji Nagar, Pune- 411 005.

DEPARTMENT OF INFORMATION TECHNOLOGY

E- Curriculum Booklet

YEAR: 2019-2020 **SEMESTER: II**

CLASS: BE **DIV: A& B**

VISION AND MISSION OF THE INSTITUTE

Vision Statement:

To create a collaborative academic environment to foster professional excellence and ethical values

Mission Statement:

1. To develop outstanding professionals with high ethical standards capable of creating and managing global enterprises
2. To foster innovation and research by providing a stimulating learning environment
3. To ensure equitable development of students of all ability levels and backgrounds
4. To be responsive to changes in technology, socio-economic and environmental conditions
5. To foster and maintain mutually beneficial partnerships with alumni and industry

VISION AND MISSION OF THE DEPARTMENT

Vision Statement:

To develop proficient IT engineers for the Industry and Society.

Mission Statement:

1. To achieve academic excellence.
2. To develop students for being competent in dynamic IT environment.
3. To encourage research and innovation.
4. To inculcate moral and professional ethics.

PEO's OF THE DEPARTMENT

1. Demonstrate sustained learning by building the profound foundation of math's, science and engineering principles and make the students erudite self-reliant and adaptable todiverse culture of multidisciplinary environment.
2. Prepare graduate with strong knowledge and skills in the field of InformationTechnology to develop solutions of complex engineering problems.
3. To bring leadership skill with teamwork in continuous learning environment to bearwith professional challenges.
4. To inculcate ethics towards issues of professional and social relevance.

PSO's OF THE DEPARTMENT

1. Graduate exhibits skills to analyze, design and develop software.
2. Graduate demonstrate technical competency and leadership qualities to work in multidisciplinary environment.

PROGRAM OUTCOMES

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6.The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

LONG TERM GOALS

1. To Improve Industry Collaboration.
2. Promote Faculty for Research.
3. To Introduce Post Graduates Programme and Research Center.
4. To Enhance Infrastructure and lab development.

SHORT TERM GOALS

1. To enhance teaching learning process with effective utilization of e-resources
   - Moodle
   - Activity Based Teaching.
   - Online Courses. (NPTEL/Spoken Tutorials)
2. To organize national level conference / workshop.
3. Focused Interaction with Alumni.
   - Forum for Career Guidance
   - Guidelines for Training and Placements
   - Expert /Webinar/Seminar
   - Suggestions on Programme Improvisation.

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6.	Home Assignments	17	42	61	80	96	-	-	-	-
7.	Practical Practice Questions	-	-	-	-	-	-	119	129	140
8.	Oral Question Bank	-	-	-	-	-	-	120	130	141
9.	Additional Resources	23	45	64	84	-	112	123	133	147

STUDENT ACADEMIC CALENDAR

Sr. No.	Day & Date	Activity
1.	10/12/19 Tuesday	• Time Table Display
2.	16/12/19 Monday	• Term commencement (SE-BE). • Student registration. • HOD's address.
3.	07/01/20 Tuesday	• Term commencement (FE). • Student registration. • HOD's address.
4.	16/01/20 Thursday	• Review of first month attendance (SE-BE). • Counseling by GFM & HOD.
5.	25/01/20 Saturday	• Kanitkar Day.
6.	26/01/20 Monday	• Republic Day.
7.	07/02/20 Friday	• Review of first month attendance (FE). • Counseling by GFM & HOD.

8.	17 – 22/02/20 Monday- Saturday	• Midterm verification of Lab work (SE-BE)
9.	17/02/20 Monday	• Review of second month attendance (SE-BE). • Counseling by GFM & HOD.
10.	07/03/20 Saturday	• Review of Second month attendance (FE). • Counseling by GFM & HOD.
11.	09 - 14/03/20 Monday- Saturday	• Midterm verification of Lab work (FE)
12.	16/03/20 Monday	• Review of third month attendance (SE-BE). • Counseling by GFM & HOD.
13.	21/03/20 Saturday	• Parent's Meet
Sr. No.	**Day & Date**	**Activity**
14.	01/04/20 - 09/04/20 Monday – Thursday	• Mock Oral Practical Exam/Submission (SE-BE).
15.	04/04/20 Saturday	• Review of final attendance (SE-BE). • Counseling by GFM & HOD.
16.	07/04/20 Tuesday	• Review of Third month attendance (FE). • Counseling by GFM & HOD.
18.	11/04/20 Saturday	• Term End (SE-BE).
19.	13/04/20 - 27/04/20 Monday -Monday	• University Practical / Oral Exam (SE-BE).
20.	20/04/20 Monday	• Review of final attendance (FE) • Counseling by GFM & HOD.
21.	20 - 25/04/2020 Monday - Saturday	• Mock Oral Practical Exam/Submission (FE)
22.	05/05/20 - 30/05/20 Tuesday - Saturday	• University Theory Exam (SE-BE).

23.	09/05/20 Saturday	• Term End (FE)

* These are tentative dates, subject to change.

** Exam form submission, FE and SE Online Examination, TE, BE In-Semester Examination, FE, MCA-I and MBA-I Theory Examination will be scheduled are as per Savitribai Phule Pune University notification.

Important Note:

- Schedule Parent's Meet after In-sem period.
- Periodic Assessment tools (Unit test/ MCQ/ Presentations/ Hands on/ Mini projects/ Activity etc.) are at the discretion of departmental end as per the necessity.

HOD (IT)

Mrs.

STUDENT CO CURRICULER ACTIVITY CALENDAR

Sr No.	Date	Name of activity	Duration	Mapping with PO's	Guest speaker with Organization	Beneficiaries	Faculty Incharge
ITSA							
1.	11/1/20	Project Demo from start to End	2 Hrs	PO8,9,10,11, 12	Dhanashri Rajopadhye	TE	Mrs. Ashwini Bhamare / Ms. Anita Devkar
2.	8/2/20	Insights of Project development	4 Hrs	PO10,11,6,12,5	Mr.Raghavendra Shastri, Amphenol India,	TE	Mrs. Ashwini Bhamare/ Ms Anita Devkar
3.	8/2/20	Internet Web Programming	4 Hrs	PO 1, 5, 11,12	Mr. Sagar Sawant	BE	Ms. Jyoti Jadhav
4.	6/3/20	Gender Equity Program	2 Hrs	PO 8	Mrs. Sujata Honap, Dynaprobodhini	Students and Staff	Ms. Poonam Rakibe
5.	7/3/20	Yoga and Meditation	2 Hrs	PO 6	Mr. N.M. Lokhande,	Staff	Mrs.Swapna Bhavsar
6.	11/4/20	Farewell Function	2 Hrs	-	PES's MCOE	BE	Ms.Suhasini Bhat / Mr. Deepak Tamhane
7.	14/2/20	Workshop on " Data Science"	1 Day	PO 2,3,5	Mrs. Pallavi Shejwal. Pune	TE	Mrs. Ashwini Bhamare
App Club							

8.	4/1/20 to 28/3/20	App Training Development	20 Hrs	PO5	Vallabh Hake and Group PES's MCOE, IT Dept	SE/TE/BE	Mr. Deepak Tamhane Mr.Rohit Tate
GraphiX Club & VVM							
9.	22/1/20	Session on GPU programming	2 Hrs	PO5	Mr. Yadnesh Kulkarni	SE/TE/BE	Mrs. Ketaki Gawali
10.	23/1/20	Workshop on Advanced Gaming Tools	4 Hrs	PO5	Mr. Vishwas Patki WMS Commerce Zone, Pune	SE/TE/BE	Mrs. Prajkta Rakshasbhuvankar
PixInsight Club							
11.	25/1/20	Poster Making Competition cum exhibition	1 Day	PO 6,9,10	Mr. Sujit Niwangune Foto Flash Digital Lab and Studio 9881904727	SE/TE/BE	Mrs. Suhasini Bhat
Audit Course							
11.	4/1/20 to 28/3/20	Japanese Module II	20 Hrs	PO 9,10,12	Mrs. Amita Godase	SE/TE/BE	Mrs. Ashwini Bhamare
12.	18/1/20	Science of Happiness	2 Hrs	--	Mr. Makrand Tillo	Staff and Students	Mrs. S.L.Bhat Ms. Shoma Mitkari
13.	29/2/20	Science of Happiness	2 Hrs	--	Ms. Vaishali Kalaskar, 9405540084 Yogada Satsang	Staff and Students	
14.	1/2/20	Intellectual Property Rights	2 Hrs	PO 4	Mr. Mayuresh Kulkarni	TE/BE	Mrs. Ashwini Bhamare
15.	7/3/20	Intellectual Property Rights	2 Hrs	PO 4	Ms. Sneha Nagarkar, Senior Patent Associate, Stat Juris	TE/BE	Mrs. V.G.Dixit
16.	6,7,8/ 1 /20	Udyojak: An entrepreneur (Central)	3 days	PO 3, 8, 9	Madan Kumar Shelke	SE/TE/BE	Mr. Digvijay Patil
CSI / ACM							
17.	11/1/20	Social Activity: School Visit	4 Hrs	PO 6,7	PES Modern COE, Pune	TE	Mrs. Smita Khavate
18.	28/3/20	Aspire 2k20 Project Competition (State Level)	1 Day	PO 3,5, 9,10,11,12	Industry Judges	BE	Mrs. Smita Khavate
19.	6/2/20	Techtalk	1 Day	PO 3,5,9,10	ACM Chapter	SE/TE/BE	Mrs. Ashwini Bhamare
Project Activities							

20.	10/1/20	Poster Competition	1 Day	PO 3,5, 9,10,11,12	Mr. Mahesh Gawali	BE	Mrs. V.G.Dixit
21.	28/2/20	Departmental Project Competition	1 Day	PO 3,5, 9,10,11,12	Industry Judges	BE	Mrs. V.G.Dixit
Soft Skill Training and Placement (T&P)							
22.	16/12/19	Syntel-GTT placement Training	16 Days	PO 1,23,5,9,12	Ms. Mrunal Syntel-GTT	BE	Mrs. V.S.Kamble Mr. Digvijay Patil
23.	9/3/20	Soft Skill and Aptitude Training	10 DAys	PO 1,23,5,9,12	Rubicon	TE	Mrs. V.S.Kamble Mr. Digvijay Patil
ED Activities							
24.	6,7,8/ 1 /20	Udyojak: An entrepreneur (Central)	3 days	PO 3, 8, 9	Madan Kumar Shelke	SE/TE/BE	Mr. Digvijay Patil
Career Guidance/Competitive Examinations							
25.	22/2/20	Technical Seminar	8 Hrs	PO 9,10,12	Oracle	TE/BE	Mrs. V.S.Kamble Mr. Digvijay Patil
26.	30/1/20	Importance of GATE Exam	1 Hr	PO 12	Vani Institute, Pune	BE	
Industrial Visit (IV)							
27.	29/2/20	Industrial Visit (Central)	1 Day	PO 12	TCS, Pune	BE	Mr. Deepak Tamhane
28.	26/3/20	Industrial Visit (Rural Technology)	1 Day	PO 12	Hivrebajar, Ahmednagar	BE	
FDP/QIP							
29.	2,3, & 4/12/19	FDP on Python Programming	3 Days	PO 1,2,3,5	Internal Faculties	Staff	Mr. Rohit Tate and FE team
National Service Scheme(NSS)/ Institute Social Responsibility (ISR)							
30.	1/2/20	IT awareness Program	1 Day	PO 6	Deepak Tamhane and Team	Students in village	Deepak Tamhane and Team
31.	8/2/20	Cashless Transaction	1 Day	PO6	Deepak Tamhane and Team	Students in village	
Alumni Activities							
32.	4/3/20	Alumni Meet	1 Day	PO 9,10	Internal Faculties	Students	Mrs. Swapna Bhavsar Mr. V.S.Kamble

33.	4/1/20	Coral Draw for Poster Making	2 Hrs	PO 5	Mr. Suraj Patil	BE	Mrs. V.G.Dixit
Mpulse							
34.	Mid February 2020	Googler Code-o-Friend Keyboard Shelling Mock Placement	2 Days	PO 9,10,11,12	PES's MCOE, Pune	SE/TE/BE	Mr.Digvijay Patil
Spandan							
35.	--	Cultural Activity	1 Day	--	PES's MCOE, Pune	SE/TE/BE	Ms. Tanmayee Sawant

TIME TABLE BE A

DAY \ TIME	10.00 to 11.15	11.15 to 11.45	11.45 to 12.45	12.45 to 1.45	1.45 to 2.00	2.00 to 3.00	3.00 to 4.00
MON	CL IX (DP/SAK)	RECESS	ELEC III (SAK/JJ)	ELEC IV (DP/SJ)	RECESS	UC (TK)	DCS (DP)
TUE	CL X (TK/SP)		ELEC III (SAK/JJ)	ELEC IV (DP/SJ)		UC (TK)	DCS (DP)
WED	ELEC III IWP (JJ)		UC (TK)	ELEC IV (DP/SJ)			
THU	ELEC III IOT (SAK)		ELEC III (SAK/JJ)	DCS (DP)			
FRI	PROJECT		PROJECT			PROJECT	

DAY \ TIME	10.00 to 11.00						
SAT	Audit Course 6	RECESS					

GFM : - Mr. Digvijay Patil

Name of the Subject	Teaching Staff & Seating Arrangement
UC: Ubiquitous Computing	TK : Mrs. Tanmayee Kute SP : Mr. Shantanu Pawar
DCS: Distributed Computing System	DP : Mr. Digvijay Patil SAK : Mrs. Sampada Kulkarni

ELEC III : Elective III IOT: Internet of the Things IWP: Internet Web ogramming	SAK : Mrs. Sampada Kulkarni JJ : Ms. Jyoti Jadhav
ELEC IV: Elective IV RT : Rural Technologies and Community Development SMA: Social Media Analytics	DP : Mr. Digvijay Patil SJ : Ms. Supriya Jagtap

TIME TABLE BE B

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DAY \ TIME	10.00 to 11.15	11.15 to 11.45	11.45 to 12.45	12.45 to 1.45	1.45 to 2.00	2.00 to 3.00	3.00 to 4.00
MON	CL IX (VSK/PR)		ELEC III (SAK/JJ)	ELEC IV (VSK/SJ)		UC (KMG)	DCS (VSK)
TUE	CL X (KMG/JJ)		ELEC III (SAK/JJ)	ELEC IV (VSK/SJ)		UC (KMG)	DCS (VSK)
WED	ELEC III IWP (JJ)	RECESS	UC (KMG)	ELEC IV (VSK/SJ)	RECESS		
THU	ELEC III IOT (SAK)		ELEC III (SAK/JJ)	DCS (VSK)			
FRI	PROJECT		PROJECT			PROJECT	

DAY \ TIME	10.00 to 11.00						
SAT	Audit Course 6		RECESS				

GFM : - Ms. Jyoti Jadhav

Name of the Subject	Teaching Staff & Seating Arrangement
UC: Ubiquitous Computing	KMG : Mrs. Ketki Gawali JJ : Ms. Jyoti Jadhav
DCS: Distributed Computing System	VSK : Mr. Vishnu Kamble PR : Ms. Poonam Rakibe
ELEC III : Elective III IOT: Internet of the Things IWP: Internet Web ogramming	SAK : Mrs. Sampada Kulkarni JJ : Ms. Jyoti Jadhav
ELEC IV: Elective IV RT : Rural Technologies and Community Development SMA: Social Media Analytics	VSK : Mr. Vishnu Kamble SJ : Ms. Supriya Jagtap

COURSE STRUCTURE

Subject Code	Subject	Teaching Scheme			Examination Scheme					Total Marks	Credits
		Lecture	Practical	Tutorial	In-Sem	TW	PR	OR	End-Sem		
414462	Distributed Computing System	3	--	--	30	--	--	--	70	100	3
414463	Ubiquitous Computing	3	--	--	30	--	--	--	70	100	3
414464	Elective-III	3	2	--	30	25	--	25	70	150	4
414465	Elective-IV	3	--	--	30	--	--	--	70	100	3
414466	Computer Laboratory-IX	--	4	--	--	50	50	--	--	100	2
414467	Computer Laboratory-X	--	2	--	--	25	--	25	--	50	1
414468	Project Work	--	--	6	--	50	--	100	--	150	6
414469	Audit Course-VI	--	--	--	--	--	--	--	--	Grade	
Total		12	8	6	120	150	50	150	280	750	22
Total of Part-II		26				750					

IMPORTANT INSTRUCTIONS

It is essential that the student attends all classes in time from the first day to the last day of each term.

1. Minimum of 75% attendance for lectures and practical sessions is mandatory for all students.
2. In case the attendance falls below 75% , term will not be granted and the student will not be allowed to appear for the University examination
3. Student should complete term work such as Journals, Files as per schedule. If the student fails to complete the term work to the entire satisfaction of the Head of the Department his/her term will not be granted and he/she will not be allowed to appear for the University examination.
4. Attendance to all class tests or internals exams is compulsory.
5. Students are always required to carry Identity card (duly signed by Authority) every day to college and shall show the same on demand by any faculty/official of the Institute in the campus.
6. Students are advised to maintain good rapport with classmates and staff.
7. Institute uniform is compulsory on specified days, during University examinations, for internal tests and special functions decently dressed on the other days of the week.

TERM WORK EVALUATION

Final term work will be given based on throughout performance of the student. 100 marks are distributed in (60 for continuous assessment + 15 for internal test result + 5 for general behavior + 20 for attendance of student)

- 60 marks shall be awarded to the students, based on their journal work, which includes experiment's write up, program print out.Each assignment should be evaluated for 10 marks.
    - Distribution of 10 marks for each assignment is as follows:

Sr. No.	Head	Marks
i.	Coding standards, proper indentation, Comments, Documentation	2 Marks
ii.	Timely submission	3 Marks
iii.	Test cases / originality / Understanding of Assignment	5 Marks

- 15 marks shall be allotted based on the marks of Class test/ Assessment test per unit/ mock exam.
- 5 marks for General Behavior.
- 20 Marks as per the college policy for Term Work, marks are to be awarded for attendance as per the below, based on the percentage of attendance per subject, combining lectures and practical's together, wherever applicable.

Sr No.	%of attendee=total(Lectures + Practical's attended)	Marks
1	90 to 100	20
2	85to<90	16
3	80to<85	12
4	75 to <80	10

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PROGRESSIVE EDUCATION SOCIETY
Pune - 5
Modern College of Engineering
Pune - 5

EXAM EVALUATION CRITERIA

University Examination

Phase I Online examination of 25 marks, 30 minutes duration, containing objective- multiple choice questions (MCQ) and fill in blanks; based on unit I and unit II of the subject

Phase II Online examination of 25 marks, 30 minutes duration, containing objective- multiple choice questions (MCQ)) and fill in blanks; based on unit III and unit IV of the subject

University Practical Examination of 50 marks oral/ practical duration 3 hr, contain problem statement based on assignment submitted as term work during lab hours Each chit will have 3 problem statements

- Every student will pick up one chit randomly and will perform one assignment/experiment out of three written on his/her chit.
- Practical examination will be based on the term work.
- Oral examination (if applicable i.e. in case of Oral as a separate passing head) will be based on journal and theory syllabus
- Questions will be asked during the practical examination to judge the understanding of the practical performed in the examination

Note: student will be allowed for university practical examination only when, all types of assignments given by respective staff and Satisfying attendance criteria

Phase III Written examination of 50 marks, 2 hours duration; based on all the six units, shall be conducted at the end of semester, as per the schedule of the university.

Internal Examination

MCQ Test 1

Test of 25 marks, 30 minutes duration, containing objective- multiple choice questions (MCQ) and fill in blanks; based on unit I and unit II of the subject.

MCQ Test 1

Test of 25 marks, 30 minutes duration, containing objective- multiple choice questions (MCQ) and fill in blanks; based on unit I and unit II of the subject

414462 Distributed Computing System

SYLLABUS

Teaching Scheme:	Credits	Examination Scheme:
Lectures: 3 Hours/Week	03	In-Semester (Online): 50 Marks End-Semester: 50 Marks

UNIT I:	FUNDAMENTALS AND ARCHITECTURES	(6 Hours)

Introduction: Characteristics and examples of distributed systems, Design goals, Types of distributed systems, Trends in distributed systems, focus on Resource Sharing, Challenges. Architectures: Architectural styles, middleware and middleware organization, system architectures, Example architectures.

Case Study: The World Wide Web

UNIT II:	COMMUNICATION AND COORDINATION	(6 Hours)

Communication: Introduction, Layered protocols , Types of communication, Inter-process Communication, Remote Procedure Call (RPC), Message oriented communication, Multicast Communication, Network Virtualization: Overlay Network Coordination: Clock Synchronization, Logical Clocks, Mutual Exclusion, Election algorithms, Distributed event matching, Gossip Based coordination

Case Study: IBM's Websphere Message-Queuing System

UNIT III:	REPLICATION AND FAULT TOLERANCE	(6 Hours)

Replication: Reasons for replication, Replica management, Failure masking and replication, Consistency protocols, Catching and replication in web, Fault Tolerance: Introduction, Failure models, Fault systems with arbitrary failures, Reliable client server communication, Reliable group communication, Distributed commit, Recovery, Checkpoints.

Case Study: Catching and Replication in Web

UNIT IV:	DISTRIBUTED FILES AND MULTIMEDIA SYSTEMS	(6 Hours)

Distributed File Systems: Introduction, File System Architecture, Sun Network File System, and HDFS. Name Services: Introduction, Name Services and the Domain Name System, Directory Services.

Case Study: 1. The Global Name Service, 2. The X.500 Directory Service.

Distributed Multimedia Systems: Characteristics of Multimedia Data, Quality of Service

Management, Resource management, Stream Adaptation.

Case Study: BitTorrent and End System Multicast.		
UNIT V:	**DISTRIBUTED WEB BASED SYSTEM**	**(5 Hours)**
Architecture of Traditional Web-Based Systems, Apache Web Server, Web Server Clusters, Communication by Hypertext Transfer Protocol, Synchronization, Web Proxy Caching, Replication for Web Hosting Systems, Replication of Web Applications, Fault Tolerance in distributed web based Systems, Security Concerns. **Case Study: HyperText Transfer Protocol (HTTP)**		
UNIT VI:	**SECURITY IN DISTRIBUTED SYSTEMS**	**(7 Hours)**
Introduction to Security: Security Threats, Policies, and Mechanisms, Design Issues, Cryptography. Secure Channels: Authentication, Message Integrity and Confidentiality, Secure Group Communication, Access Control: General Issues in Access Control, Firewalls, Secure Mobile Code, Denial of Service(DOS). Security Management: Key Management, Secure Group Management, Authorization Management. Emerging Trends In Distributed Systems: Grid Computing, Service Oriented Architectures(SOA). **Case Study: Kerberos.**		

Text Books :

1. Maarten van Steen, Andrew S. Tanenbaum, Distributed Systems , PHI, 3rd Edition Version 3.01, ISBN:978-15-430573-8-6 (Printed)

2. Andrew S. Tanenbaum, Maarten van Steen, Distributed Systems – Principles and Paradigms, PHI ,2nd Edition, ISBN: 978-0130888938

Reference Books:

1. George Coulouris, Distributed Systems: Concepts and Design,Pearson, 5th edition, Jean Dollimore, Tim Kindberg, Gordon Blair, ISBN:13: 978-0132143011, ISBN:10: 0132143011

2. Abhijit Belapurkar, Anirban Chakrabarti, Harigopal Ponnapalli, Niranjan Varadarajan, Srinivas Padmanabhuni, Srikanth Sunderrajan, Distributed System Security: Issues, Processes and solutions, Willey online Library, ISBN: 978-0-470-51988-2

3. Sunita Mahajan, Seema Shah, Distributed Computing, Oxford University Press, 2nd Edition, ISBN-13: 978-0198093480

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit/ Assignment	Assessment Technique	Blooms Taxonomy Category
C414462.1	To explain the principles and desired properties of distributed systems based on different application areas.	I	Pre In Sem Test	Understanding
C414462.2	To apply the basic theoretic concepts and algorithms of distributed systems in problem solving.	II		Applying
C414462.3	To analyze the inherent difficulties that arises due to distributed-ness of computing resources.	III		Analyzing
C414462.4	To identify the challenges in developing multimedia system applications.	IV	Pre End Sem Test	Applying
C414462.5	To classify distributed files system and distributed multimedia systems.	V		Analyzing
C414462.6	To discuss the issues that arises while providing security in distributed systems.	VI		Creating

PREREQUISITES

Sr. No.	Unit Number	Prerequisite subject name
1.	I	Computer Networks, Operating Systems
2.	II	Computer Networks, Operating Systems
3.	III	Computer Networks, Operating Systems
4.	IV	Computer Networks, Operating Systems
5.	V	Computer Networks, Operating Systems, Web Engineering Technology
6.	VI	Computer Networks, Operating Systems, Web Engineering Technology

TEACHING PLAN

Teaching Plan Short

Academic Year:- 2020-21 Semester :- II w. e. f. :- 21.01.2021

Class : - BE Division: A/B

Subject :- DCS Subject Code :- 414462

Faculty In charge :- Vishnu Kamble,Poonam RAkibe, Digvijay Patil, Sampada Kulkarni No. of Lectures/ weeks: 03

- **Lecture Plan**

Sr. No.	Unit No.	Unit/ Topic Name	Start Date	End Date
1.	I	Fundamentals and Architectures	3rd week (December)	4th week (December)
2.	II	Communication and Coordination	1st week (Jan)	2nd week (Jan)
3.	III	Replication and Fault Tolerance	3rd week (Jan)	4th week (Jan)
4.	IV	Distributed Files and Multimedia Systems	1st week (Feb)	2nd week (Feb)
5.	V	Distributed Web Based Systems	3rd week (Feb)	4th week (Feb)
6.	VI	Security in Distributed Systems	3rd week (March)	4th week (March)

Detail Teaching Plan

Lect. No	Unit No.	Main Topic to be Covered	Sub Topics to be Covered	Chap. No. & Reference Books	CO to Attain	Measurable to Attain CO	Mode of delivery
1	I	FUNDAMENTALS AND ARCHITECTURE	Introduction: Characteristics and examples of distributed systems,	(Distributed Systems by Maarten Van Steen, Andrew S. Tanenbaum), (Distributed Systems principles and paradigms by Andrew S. tanenbaum and Maarten Van Steen) (Distributed Systems by George Coulouris, Jean Dollimore, Tim Kindberg)	C414462.1	Pre Insem Exam	PPT
2			Design goals, Types of distributed systems,				PPT
3			Trends in distributed systems, focus on Resource Sharing,				PPT
4			Challenges. Architectures: Architectural styles, Middleware and middleware organization,				PPT Google classroom
5			System architectures, Example architectures.				PPT
6			Case study: The World Wide Web.				PPT
7	II	COMMUNICATION AND COORDINATION	Communication: Introduction, Layered protocols ,	Chapter No: 4, 5 / (Distributed Systems by Maarten Van Steen, Andrew S. Tanenbaum), (Distributed Systems by Maarten Van Steen, Andrew S. Tanenbaum)	C414462.2	Pre Insem Exam	PPT
8			Types of communication, Inter-process Communication, Remote Procedure Call (RPC),				PPT Google classroom

9			Message oriented communication, Multicast Communication, Network Virtualization:				
10			Overlay Network Coordination: Clock Synchronization, Logical Clocks,				PPT Google classroom
11			Mutual Exclusion, Election algorithms, Distributed event matching, Gossip Based coordination				PPT
12			Case Study: IBM's Websphere Message-Queuing System				PPT Google classroom
13	**III**	**REPLICATION AND FAULT TOLERANCE**	Replication: Reasons for replication, Replica management,	(Distributed Systems by Maarten Van Steen, Andrew S. Tanenbaum) (Distributed Systems principles and paradigms by Andrew S. tanenbaum and Maarten Van Steen)	C414462.3	Pre Insem Exam	PPT
14			Failure masking and replication, Consistency protocols,				PPT
15			Catching and replication in web, Fault Tolerance: Introduction,				PPT
16			Failure models, Fault systems with arbitrary failures,				PPT

17			Reliable client server communication, Reliable group communication, Distributed commit, Recovery, Checkpoints.				PPT
18			Case Study: Catching and Replication in Web				PPT
19	IV	**DISTRIBUTED FILES AND MULTIMEDIA SYSTEMS**	Distributed File Systems: Introduction, File System Architecture,	(Distributed Systems by Maarten Van Steen, Andrew S. Tanenbaum)	C414462.4	Pre End sem Exam	PPT
20			Sun Network File System, and HDFS. Name Services: Introduction,				PPT
21			Name Services and the Domain Name System, Directory Services.				PPT
22			Case Study: 1. The Global Name Service, 2. The X.500 Directory Service.				PPT
23			Distributed Multimedia Systems: Characteristics of Multimedia Data, Quality of Service Management, Resource management, Stream Adaptation.				PPT
24			Case Study: BitTorrent and End System Multicast.				PPT
25	V	**DISTRIBUTED WEB BASED SYSTEMS**	Architecture of Traditional Web-Based Systems,	(Distributed Systems principles and paradigms by Andrew S. tanenbaum and Maarten Van Steen)	C414462.5		PPT
26			Apache Web Server, Web Server Clusters,				PPT

				(Distributed Systems by Maarten Van Steen, Andrew S. Tanenbaum)		Pre End sem Exam	
27			Communication by Hypertext Transfer Protocol, Synchronization,				PPT
28			Web Proxy Caching, Replication for Web Hosting Systems, Replication of Web Applications,				PPT
29			Fault Tolerance in distributed web based Systems, Security Concerns.				PPT
30			**Case Study: HyperText Transfer Protocol (HTTP)**				PPT
31	**VI**	**SECURITY IN DISTRIBUTED SYSTEMS**	Introduction to Security: Security Threats, Policies, and Mechanisms,	(Distributed Systems by Maarten Van Steen, Andrew S. Tanenbaum), (Distributed Systems principles and paradigms by Andrew S. tanenbaum and Maarten Van Steen)	C414462.6	Pre End sem Exam	PPT
32			Design Issues, Cryptography. Secure Channels: Authentication, Message Integrity and Confidentiality,				PPT
33			Secure Group Communication, Access Control: General Issues in Access Control, Firewalls,				PPT
34			Secure Mobile Code, Denial of Service(DOS). Security Management: Key Management,				PPT
35			Secure Group Management, Authorization Management.				PPT

36			Emerging Trends In Distributed Systems: Grid Computing, Service Oriented Architectures(SOA). **Case Study: Kerberos.**				PPT

UNIT WISE QUESTION

UNIT I: FUNDAMENTALS AND ARCHITECTURES

Sr. No.	Question	CO No.	Marks	University Year
1.	Explain different types of distributed system.	C414466.1	5	May 2019 Insem
2.	Explain the role of middleware in distributed system.		5	May 2019 Insem
3.	Explain different architectural styles.		5	May 2019 Insem
4	Write a short note on world wide web.		5	May 2019 Insem
5	Give the five types of hardware resource and five types of data or software resource that can usefully be shared. Give examples of sharing as it occurs in practice in distributed systems		6	May 2018 (pattern 2012)
6	Explain the concept of web service and illustrate with suitable diagram.		4	May 2018 (pattern 2012)
7	List the various challenges during construction of distributed system. Describe the challenges while designing of scalable distributed system.		4	May 2017
8	What are various forms of transparency in distributed system? Illustrate Network transparency with an example.		4	May 2017
9	A server program written in one language provides the implementation of BLOB object that is intended to be accessed by clients that may be written in a different language. The client and server computers many have different hardware, but all of them are attached to an internet. Describe the problems due to each of the five aspects of heterogeneity that need to be solved to make it possible for a client object to invoke a method the server object.		6	May 2017
10	Explain the architectural models of distributed systems with suitable example		6	Feb 2016
11	Explain in brief, various types of models based on fundamental properties and the failures they might exhibit.		4	Feb 2016
12	What is middleware? Specify its need with examples of middleware.		8	Dec 2015
13	What is heterogeneity? How to handle it in distributed system,?		8	Dec 2015

14	What is distributed system? Explain different examples of DS		8	Dec 2013
15	Show an example of transparency that may not be desirable in distributed systems		8	Dec 2013
16	List out different types of transparencies associated in a Distributed System.		8	Dec 2014
17	Describe the working of Distributed System based upon middleware software systems. Also clearly describe the roles played by middleware in Distributed System.		8	Dec 2014
18	When a Distributed System can be considered as an Open Distributed System? Mention benefits provided by an Open System.		8	Dec 2014
19	Describe architecture model of the Distributed System design. How these models play important roles in the design of a Distributed System.		8	Dec 2014
20	Write a short note on various failure models		6	May 2014
21	Define Distributed System. List advantages and disadvantages of the same		6	May 2014
22	Explain challenges in heterogeneity in distributed system and how it is overcome?		8	May 2014
23	Describe the working of Distributed System based upon middleware software systems. Also clearly describe the roles played by middleware in Distributed System.		8	May 2013

UNIT-II :COMMUNICATION AND COORDINATION

Sr. No.	Question	CO No.	Marks	University Year
1.	Explain the different types of distributed communication.	C414462.2	6	May 2019 Insem
2.	Write short note on - (any one) 1.Remote procedure call 2.Network virtualization		4	May 2019 Insem
3.	Explain in detail message oriented communication.		5	May 2019 Insem
4	Explain election algorithm in detail.		5	May 2019 Insem
5	Distinguish RPC and RMI RMI and CORBA		6	May 2018 Pattern 2012
6	Explain Richart and Agrawala algorithm to implement mutual exclusion between N peer processes that is based upon multicast.		8	May 2017
7	Explain Network Time Protocol to distribute time information over internet.		8	May 2017

8	Explain the Candy Lamport "snapshot" algorithm for determining global states of distributed systems.		8	May 2017
9	What is public-subscribe system of communication?		4	May 2017
10	Explain two main characteristics of distributed event-based systems.		4	May 2017
11	Explain the role of client and server stub procedures in RPC in the context of procedural language.		6	May 2017
12	What are the characteristics of multicast messages that provide a useful infrastructure of constructing distributed system?		4	Feb 2016 Insem
13	A client makes RPC/RMI to a server. The client takes 5 milliseconds to compute the arguments for each request, and the server takes 10 milliseconds to process each request. The local operating system processing time for each send or receive operation is 0.5 milliseconds, and the network time to transmit each request or reply message is 3 milliseconds. Marshalling or unmarshalling takes 0.5 milliseconds per message. Calculate the time taken by the client to generate and return from two requests: (a) if it is single-threaded, and (b) if it has two threads that can make requests concurrently on a single processor. You can ignore context-switching times. (2) Is there a need for asynchronous RPC/RMI if client and server processes are threaded?		6	Feb 2016 Insem
14	Explain the RPC Exchange protocols used for implementing various types of RPCs.		6	Feb 2016 Insem
15	Explain three communication primitives of request-reply protocol along with message structure used in information transmission.		4	May 2016
16	What are the network time protocol's aims and features? Explain the modes through which NTP servers synchronize with one another.		8	May 2016
17	Describe implementation of ordered multicast in a non-overlapping group.		8	May 2016

UNIT-III :REPLICATION AND FAULT TOLERANCE

Sr. No.	Question	CO No.	Marks	University Year
1.	Explain replica management in detail with proper diagram		6	May 2019 Insem
2.	Explain the concept of message logging		4	May 2019 Insem

3.	Write short note on (any one) 1.Distributed commit 2.Reliable client server communication		5	May 2019 Insem
4	Explain reliable group communication detail.		5	May 2019 Insem
5	What is fault tolerance? How it increases reliability?	C414462.3	8	Dec 2015
6	Define following: Arbitrary Failures Timing Failures Backward Recovery Forward Recovery Check Pointing		10	Dec 2015
7	What is recovery line? Draw and explain domino effect in detail.		8	Dec 2015
8	Explain Flat and Hierarchical groups. ii. Open and closed groups		8	May 2014
9	Explain basic reliable multicasting? How it could be made scalable?		10	May 2014
10	What is check pointing? Explain independent check pointing and coordinated check pointing.		8	May 2014
11	In fault tolerant distributed system how check pointing is used? Describe following check-pointing: Independent check-pointing ii. Coordinated check-pointing		8	May 2013
12	Explain following points related to fault tolerance issues in distributed systems: 1. Availability 2. Reliability 3. Failure models 4. Triple Modular Redundancy		10	May 2014
13	Explain following points related to recovery for providing fault tolerance capacities: 1. Backward recovery 2. Forward recovery 3. Sender based logging 4. Receive based logging 5. Stable storage		10	May 2014
14	How failure masking is used to provide fault tolerance capability in distributed system?		8	May 2014

UNIT-IV:DISTRIBUTED FILES AND MULTIMEDIA SYSTEMS

Sr. No.	Question	CO No.	Marks	University Year
1.	Define the global state. Explain the snapshot algorithm for determining the global state of the distributed system.			May 2018 pattern 2012

2.	Explain the following terms with respect to distributed multimedia system. i) Resource Management ii) Stream Adaptation.	C414462.4	10	May 2017
3.	Explain the cluster based distributed file systems with suitable example of HDFS.		8	May 2017
4	Illustrate the concept of naming services and DNS in distributed systems.		8	May 2017
5	Explain the design of BitTorrent, a file sharing application.		8	May 2017
6	How does distributed file system differ from a file system used for a centralized time sharing system?		8	May 2017
7	Explain the objectives and architectures of HDFS in detail.		8	May 2016
8	How is the X.500 directory services implemented?		8	May 2016
9	List the different distributed file system requirements. Explain the abstract file service architectural model with neat diagram.		8	May 2016
10	Write a detailed note on Domain Name System.		8	May 2016
11	Write short note on the following(any 2) Cloud Computing Secure Channel Cryptographic Algorithms		10	May 2016

UNIT-V :DISTRIBUTED WEB BASED SYSTEMS

Sr. No.	Question	CO No.	Marks	University Year
1.	Explain the basic architecture of Web-Based systems.	C414462.5	5	
2.	What is Apache Web Server and how it works?		5	
3.	What are the features of Apache Web Server?		5	
4	How to build high availability web server cluster?		5	
5	How is http used in web communication?		5	
6	What is web proxy cache? Also explain how to clear proxy cache.		5	
7	What is host based replication on web?		5	
8	Give an analysis of caching and replication strategies for web applications.		5	
9	Explain an fault tolerance approach for distributed web based systems.		5	
10	What are the security concerns in distributed web based system?		5	

UNIT-VI :SECURITY IN DISTRIBUTED SYSTEMS

Sr. No.	Question	CO No.	Marks	University Year
1.	What do you meant by public key cryptography? Explain digital signatures with public key.	C414462.6	8	May 2017

2.	How is a host protected from mobile code using java sandbox?		8	May 2017
3.	Explain Secure Mobile code in brief with reference to JAVA sandbox.		8	May 2016
4	Write short note on the following(any 2) Cloud Computing Secure Channel Cryptographic Algorithms		10	May 2016
5	State and explain various security mechanisms for achieving security in distributed systems.		8	May 2016
6	Write a short note on the following: Application of cryptography and political obstacles. Symmetric and Asymmetric algorithms.		10	May 2016
7	What do you mean by security? How can we achieve security in distributed computing system?		6	
8	Write a short note on: Security Threat		6	
9	List and explain different security mechanisms.		5	
10	What are secure channels? Explain in detail.		5	
11	Comment on: Kerberos		5	
12	What is access control? List and explain general issues involved in access control.		5	
13	What is firewall? Explain with neat diagram.		5	

HOME ASSIGNMENT

BE (Semester I)

UNIT-I :FUNDAMENTALS AND ARCHITECTURE

UNIT-II :COMMUNICATION AND COORDINATION

Sr. No.	Question	CO No.	Marks	University Year
1.	What is distributed system? Explain different examples of Distributed system?	C414466.1	8	Dec 2013
2.	How would you summarize the challenges while designing of scalable distributed system?		4	May 2017
3.	What can you say about the middleware? Specify its need with examples of middleware?		8	Dec 2015
4	What is heterogeneity? How to handle it in distributed system?		8	Dec 2015
5	Show an example of transparency that may not be desirable in distributed systems.		8	Dec 2013

Sr. No.	Question	CO No.	Marks	University Year
1.	Build the Richart and Agrawala algorithm to implement mutual exclusion between N peer processes that is based upon multicast.	C414466.2	8	May 2017
2.	Apply the Candy Lamport "snapshot" algorithm for determining global states of distributed systems with example.		8	May 2017
3.	A client makes RPC/RMI to a server. The client takes 5 milliseconds to compute the arguments for each request, and the server takes 10 milliseconds to process each request. The local operating system processing time for each send or receive operation is 0.5 milliseconds, and the network time to transmit each request or reply message is 3 milliseconds. Marshalling or unmarshalling takes 0.5 milliseconds per message. Calculate the time taken by the client to generate and return from two requests: (a) if it is single-threaded, and (b) if it has two threads that can make requests concurrently on a single processor.		6	Feb 2016 Insem
4	How would you use RPC Exchange protocols used for implementing various types of RPCs.?		6	Feb 2016 Insem
5	Describe implementation of ordered multicast in a non-overlapping group.		8	May 2016

UNIT-III :REPLICATION AND FAULT TOLERANCE

Sr. No.	Question	CO No.	Marks	University Year
1.	How does distributed file system differ from a file system used for a centralized time sharing system?	C414466.4	8	May 2017
2.	How is the X.500 directory services implemented?		8	May 2016
3.	How can you use the cluster based distributed file systems with suitable example of HDFS?		8	May 2017
4	How can you apply the design of BitTorrent, a file sharing application.		8	May 2017
5	What facts you will select to use the cloud computing in the distributed system?		10	May 2016

UNIT-IV:DISTRIBUTED FILES AND MULTIMEDIA SYSTEMS

Sr. No.	Question	CO No.	Marks	University Year
1.	What elements would you choose to avoid fault tolerance ? How it increases reliability?	C414466.3	8	Dec 2015
2.	What is check pointing? Explain independent check pointing and coordinated check pointing.		8	May 2014
3.	In fault tolerant distributed system how check pointing is used? Describe following check-pointing: Independent check-pointing ii. Coordinated check-pointing		8	May 2013
4	How failure masking is used to provide fault tolerance capability in distributed system?		8	May 2014
5	What is recovery line? Draw and explain domino effect in detail.			

	UNIT-V :DISTRIBUTED WEB BASED SYSTEMS			
Sr. No.	Question	CO No.	Marks	University Year
1.	How is http used in web communication?	C414466.5	5	
2.	How to build high availability web server cluster?		5	
3.	Give an analysis of caching and replication strategies for web applications.		5	
4	How would you categorized apache web server?		5	

Additional Resources

1. https://nptel.ac.in/courses/106106107/
2. https://onlinecourses.nptel.ac.in/noc17_cs42/preview
3. http://web.cs.wpi.edu/~cs4513/c16/
4. Practical Assignments: https://www.youtube.com/watch?v=IKsHhaI1mdg

414463 Ubiquitous Computing

SYLLABUS

414463: Ubiquitous Computing

Prerequisites:

1. Human Computer Interaction.
2. Computer Network Technology

Course Objectives:

1. To describe ubiquitous computing, its properties applications and architectural design.
2. To explain various smart devices and services used in ubiquitous computing.
3. To teach the role of sensors and actuators in designing real time applications using
4. Ubicomp.
5. To explore the concept of human computer interaction in the context of Ubicomp.
6. To explain Ubicomp privacy and challenges to privacy.
7. To describe Ubicomp network with design issues and Ubicomp management.

Course Outcomes:

By the end of the course, students should be able to

1. Demonstrate the knowledge of design of Ubicomp and its applications.
2. Explain smart devices and services used Ubicomp.
3. Describe the significance of actuators and controllers in real time application design.
4. Use the concept of HCI to understand the design of automation applications.
5. Classify Ubicomp privacy and explain the challenges associated with Ubicomp privacy.
6. Get the knowledge of ubiquitous and service oriented networks along with Ubicomp management.

UNIT I :INTRODUCTION TO UBIQUITOUS COMPUTING (6 Hours)

Concept of Ubiquitous Computing and Advantages, Ubiquitous Computing Applications and Scope, Properties of Ubiquitous Computing, Modelling the Key Ubiquitous Computing Properties. Ubiquitous System Environment Interaction. Architectural Design for UbiCom Systems: Smart DEI Model.

UNIT II: UBIQUITOUS COMPUTING SMART DEVICES AND SERVICES (6 Hours)

Smart Devices and Service properties, Smart mobile devices and Users, Mobile code, Smart Card Devices and Networks, Service Architecture Models. Service Provision Life-Cycle. Virtual Machines and Operating Systems, OS for Mobile Computers and Communicator Devices.

UNIT III: ACTUATION AND CONTROL (6 Hours)

Tagging the Physical World, Sensors and Networks, Micro- Electro-Mechanical Systems (MEMS), Embedded Systems and Real-Time Systems. Programmable and PID type control system, Robots.

UNIT IV: HUMAN COMPUTER INTERACTION (6 Hours)

User Interfaces and Interaction for devices, Abstract user interface through Basic Smart Wearable and Implanted Devices. Human- Centered Design (HCD). User Models: Direct and indirect user input and modelling, modelling users' planned tasks and multiple tasks-based computing.

UNIT V: UBIQUITOUS COMPUTING PRIVACY (6 Hours)

Ubiquitous computing privacy definition, Solove's taxonomy of privacy, legal background, Interpersonal privacy, Ubicomp challenges to privacy: Collection scale, manner and motivation, data types, data accessibility; Case study of privacy solution such as Protecting RFID tags, ways of addressing privacy in Ubicomp.

UNIT VI: UBIQUITOUS COMMUNICATION AND MANAGEMENT (6 Hours)

Data Networks, Audio Networks, Wireless Data Networks, Ubiquitous Networks, Service oriented networks, network design issues; Configuration and Security management, Service oriented computer and information management, Context awareness

Text Books:

1. Stefan Poslad, Ubiquitous Computing, Wiley, Student Edition, ISBN:9788126527335
2. John Krumm, Ubiquitous Computing Fundamentals.

Reference Books:

1. Yin-Leng Theng and Henry B. L. Duh, Ubiquitous Computing, IGI, 2nd Edition, ISBN: 9781599046938.
2. Adam Greenfield, Everyware the Drawing age of Ubiquitous Computing, AIGA, 1st Edition, ISBN: 9780321384010.

3. Laurence T. Yeng, Evi Syukur and Seng W. Loke, Handbook on Mobile and Ubiquitous Computing, CRC, 2nd Edition, ISBN: 9781439848111.

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit	Assessment Technique	Blooms Taxonomy Category
C414463.1	Demonstrate the knowledge of design of Ubicomp and its applications.	I	Pre In Semester Test and Home Assignments	II: Understanding
C414463.2	Explain smart devices and services used Ubicomp.	II		II: Understanding
C414463.3	Describe the significance of actuators and controllers in real time application design.	III		II: Understanding
C414463 .4	Use the concept of HCI to understand the design of automation applications.	IV	Pre End Semester Test and Home Assignments	III: Applying
C414463 .5	Classify Ubicomp privacy and explain the challenges associated with Ubicomp privacy.	V		IV. Analyzing
C414463 .6	Get the knowledge of ubiquitous and service oriented networks along with Ubicomp management.	VI		I. Remembering

PREREQUISITES

Sr. No.	Unit Number	Prerequisite subject name
1.	I	Human Computer Interaction.
2.	II	Computer Network Technology.
3.	III	Computer Network Technology.
4.	IV	Human Computer Interaction.
5.	V	Human Computer Interaction. Computer Network Technology.
6.	VI	Human Computer Interaction. Computer Network Technology.

TEACHING PLAN

Teaching Plan Short:

Academic Year:-2020-21 Semester :- II w. e. f. :- 21.01.2021

Class : - BE Division: A, B

Subject :- UBIQUITOUS COMPUTING Subject Code :- 414463

Faculty In charge :- Ms.Tanmayee Kute, Mrs. Ketki Gawali, Shantanu PAwar, Jyoti Jadhav No. of Lectures/ weeks: 3

- **Lecture Plan**

Sr. No.	Unit No.	Unit/ Topic Name	Start Date	End Date
1.	I	INTRODUCTION TO UBIQUITOUS COMPUTING	Dec. 3rd week	Dec.4th week
2.	II	UBIQUITOUS COMPUTING SMART DEVICES AND SERVICES	Dec. last week	Jan. 2ndweek
3.	III	ACTUATION AND CONTROL	Jan. 3rd week	Jan 4th week
4.	IV	HUMAN COMPUTER INTERACTION	Jan. last week	Feb 2nd week
5.	V	UBIQUITOUS COMPUTING PRIVACY	Feb 3rd week	Feb 4th week
6.	VI	UBIQUITOUS COMMUNICATION AND MANAGEMENT	Feb. last week	Mar. 3rd week

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Modern College of Engineering
Pune - 5

Detail Teaching Plan

Lect. No	Unit No.	Main Topic to be Covered	Sub Topics to be Covered	Chap. No. & Reference Books	CO to Attain	Measurable to attain CO	Mode of Delivery
1	**I**	**INTRODUCTION TO UBIQUITOUS COMPUTING**	Concept of Ubiquitous Computing and Advantages	Chap. No 1, Stefan Poslad, Ubiquitous Computing, Wiley, Student Edition, ISBN: 9788126527335John Krumm, Ubiquitous Computing Fundamentals.	CO 1	Pre In Semester Test and Home Assignments	Video Lecture and Chalkboard and Talk
2			Ubiquitous Computing Applications and scope	Chap. No 1, Stefan Poslad, Ubiquitous Computing, Wiley			Video Lecture and Chalkboard and Talk
3			Ubiquitous Computing Applications and scope (Continuation)	Chap. No 1, Stefan Poslad, Ubiquitous Computing, Wiley			Video Lecture and Chalkboard and Talk
4			Properties of Ubiquitous Computing, Modelling the Key Ubiquitous Computing Properties.	Chap. No 1, Stefan Poslad, Ubiquitous Computing, Wiley			Video Lecture and Chalkboard and Talk

5			Ubiquitous System Environment Interaction	Chap. No 1, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
6			Architectural Design for UbiCom Systems: Smart DEI Model.	Chap. No 1, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
7	**II**	**UBIQUITOUS COMPUTING SMART DEVICES AND SERVICES**	Smart Devices and Service properties	Chap. No 2,3, Stefan Poslad, Ubiquitous Computing, Wiley	CO 2	Pre In Semester Test and Home Assignments	Chalkboard and Talk
8			Smart mobile devices and Users, Mobile code	Chap. No 4, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
9			Smart Card Devices and Networks	Chap. No 4, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
10			Service Architecture Models, Service Provision Life-Cycle	Chap. No 3, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
11			Virtual Machines and Operating Systems	Chap. No 3, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
12			OS for Mobile Computers and Communicator Devices.	Chap. No 4, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk

13	**III**	**ACTUATION AND CONTROL**	Tagging the Physical World	Chap. No 6, Stefan Poslad, Ubiquitous Computing, Wiley	CO 3	Pre In Semester Test and Home Assignments	Video Lecture and Chalkboard and Talk
14			Sensors and Networks	Chap. No 6, Stefan Poslad, Ubiquitous Computing, Wiley			Video Lecture and Chalkboard and Talk
15			Micro- Electro-Mechanical Systems (MEMS)	Chap. No 6, Stefan Poslad, Ubiquitous Computing, Wiley			Video Lecture and Chalkboard and Talk
16			Micro- Electro-Mechanical Systems (MEMS) (Continuation)	Chap. No 6, Stefan Poslad, Ubiquitous Computing, Wiley			Video Lecture and Chalkboard and Talk
17			Embedded Systems and Real-Time Systems	Chap. No 6, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
18			Programmable and PID type control system, Robots	Chap. No 6, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
19	**IV**	**HUMAN COMPUTER INTERACTION**	User Interfaces and Interaction for devices	Chap. No 5, Stefan Poslad, Ubiquitous Computing, Wiley	CO 4	Pre End Semester Test and	Chalkboard and Talk

20			Abstract user interface through Basic Smart Wearable and Implanted Devices	Chap. No 5, Stefan Poslad, Ubiquitous Computing, Wiley		Home Assignments	Chalkboard and Talk
21			Abstract user interface through Basic Smart Wearable and Implanted Devices (Continuation)	Chap. No 5, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
22			Human- Centered Design (HCD)	Chap. No 5, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
23			User Models: Direct and indirect user input and modelling	Chap. No 5, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
24			Modelling users' planned tasks and multiple tasks-based computing.	Chap. No 5, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
25	**V**	**UBIQUITOUS COMPUTING PRIVACY**	Ubiquitous computing privacy definition	Chapter: Introduction Personal Privacy in Ubiquitous Computing Tools and System Support,	CO 5	Pre End Semester Test and Home Assignments	Chalkboard and Talk
26			Solove's taxonomy of privacy	Handout-Foundations-and-Themes-Professor-Soloves-Taxonomy-of-Privacy-01.pdf			Chalkboard and Talk

				(Privacy+Security Academy, Information Privacy Law Course Series, PROFESSOR SOLOVE'S TAXONOMY OF PRIVACY)		
27			Legal background ,Interpersonal privacy	Chap. No 2, Personal Privacy in Ubiquitous Computing Tools and System Support,		Chalkboard and Talk
28			Ubicomp challenges to privacy: Collection scaleManner and motivation	Chap No. 3&4, Personal Privacy in Ubiquitous Computing Tools and System Support,		Chalkboard and Talk
29			Data types, data accessibility	Chap No. 4, Personal Privacy in Ubiquitous Computing Tools and System Support,		Chalkboard and Talk
30			Case study of privacy solution such as Protecting RFID tags, Ways of addressing privacy in Ubicomp	Chap No. 5 & 6, Personal Privacy in Ubiquitous Computing Tools and System Support		Chalkboard and Talk

31	**VI**	**UBIQUITOUS COMMUNICATION AND MANAGEMENT**	Data Networks, Audio Networks	Chap. No 11, Stefan Poslad, Ubiquitous Computing, Wiley	CO 6	Pre End Semester Test and Home Assignments	Chalkboard and Talk
32			Wireless Data Networks, Ubiquitous Networks	Chap. No 11, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
33			Service oriented networks, Network design issues	Chap. No 11, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
34			Configuration and Security management	Chap. No 12, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
35			Service oriented computer and information management	Chap. No 12, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk
36			Context awareness	Chap. No 12, Stefan Poslad, Ubiquitous Computing, Wiley			Chalkboard and Talk

a) Text Books

1. Stefan Poslad, Ubiquitous Computing, Wiley, Student Edition, ISBN: 9788126527335 John Krumm, Ubiquitous Computing Fundamentals.

b) Reference Books

1. Yin-Leng Theng and Henry B. L. Duh, Ubiquitous Computing, IGI, 2nd Edition, ISBN: 9781599046938.
2. Adam Greenfield, Everyware the Drawing age of Ubiquitous Computing, AIGA, 1st Edition, ISBN: 9780321384010.
3. Laurence T. Yeng, Evi Syukur and Seng W. Loke, Handbook on Mobile and Ubiquitous Computing, CRC, 2nd Edition, ISBN: 9781439848111.

UNIT WISE QUESTION BANK

UNIT-I				
Q.No.	**Question**	**CO. No.**	**Marks**	**University Year**
1.	Explain the concepts of Ubiquitous Computing.	1	5	2018
2.	Explain the properties of Pervasive/ Ubiquitous Computing systems.	1	5	2018, 2019
3.	Explain Ubiquitous System Environment Interaction.	1	4	2018
4.	Draw and Explain Architectural Design of Ubiquitous Computing Systems: Smart DEI Model.	1	6	2018
5.	What are the features of Ubiquitous Computing?	1	5	2018
6.	List and explain three main types of environment context.	1	5	2018
7.	Explain Ubiquitous Computing application and scope.	1	5	2019
8.	Explain Architectural Design for UbiCom System: Smart DEI Model.	1	5	2019
9.	Explain Distributed ICT system in details.	1	5	2019
10.	Mention and describe any two promising interaction technologies that will affect ubiquitous computing environments.	1	4	-
11.	"Living in an Increasingly Digital, Interconnected World". Explain this w.r.to i. Personal memories ii.21st Century Scheduled Transport Service iii.Foodstuff management iv.Utility regulation	1	4	-
12.	Explain Applications of ubiquitous computing in industrial context.	1	5	-
13.	What are the current technology trends in UbiCom?	1	5	-
14.	What's the difference between IOT and ubiquitous computing?	1	5	-
15.	What is different between Pervasive Computing and Ubiquitous Computing?	1	5	

UNIT-II				
Q. No.	**Question**	**CO. No.**	**Marks**	**University Year**
1.	Explain in detail service provision life cycle.	2	6	2018
2.	What are the smart devices under iHCI and HPI?	2	4	2018
3.	Explain Distributed data storage.	2	4	2018
4.	What is goal of device network? What are types of device network? Explain in detail.	2	6	2018
5.	Explain smart devices under CPI and CCI.	2	5	2018
6.	Explain types of transparency mobile services.	2	5	2018
7.	Explain Service Provision Life cycle.	2	5	2019
8.	Write short note on virtual machines.	2	5	2019
9.	What are smart objects? Mention the three types of smart objects.	2	5	-
10.	Explain Service Architecture Models.	2	5	-
11.	Write a short note on OS for Mobile Computers and Communicator Devices.	2	5	-
12.	Describe the Smart Device characteristics.	2	5	-
13.	How Smart Mobile device help in Student learning Process?	2	5	-
14.	What is Smart Card Devices? How it works?	2	5	-
15.	Explain SOA(Service Oriented Architecture).	2	5	-

UNIT-III				
Q. No.	**Question**	**CO No.**	**Marks**	**University Year**
1.	What are characteristics of Sensors?	3	4	2018
2.	Explain life cycle for Tagging Physical Objects.	3	6	2018
3.	Explain RFID tags and its types.	3	6	2018
4.	Write short note on Simple PID type controllers.	3	4	2018
5.	Explain Micro Actuation and Sensing (MEMS) in detail.	3	5	2018
6.	Explain three major types of Robot.	3	5	2018
7.	Explain Tags and its types and characteristics of tags.	3	5	2019
8.	Write a short note on Embedded System and Real Time System.	3	5	2019
9.	Describe the 3 approaches to automatic location sensing with necessary examples.	3	-	-
10.	What are Sensors? Explain its types.	3	-	-
11.	Draw the architecture of a sensor node.	3	-	-

12.	What Is A Wireless Sensor Network?	3	-	-

UNIT – IV				
Q. No	**Question**	**CO No.**	**Marks**	**University Year**
1.	Explain human centered design lifecycle in detail with diagram.	4	8	2018
2.	List out all handling limited key input and explain it in detail.	4	8	2018
3.	Write short note on: Multi model visual interface Gesture interface Tangible interface	4	9	2018
4.	Describe user models and its acquisition and representation.	4	7	2018
5.	Write a short note on Multi Model Visual Interface.	4	6	2019
6.	Explain human centered life cycle.	4	6	2019
7.	Write a short note on Mobile Hand Held Device Interface.	4	4	2019
8.	Explain Direct and Indirect user input and modeling.	4	6	2019
9.	Write a short note on Multiple task based computing.	4	6	2019
10.	Explain Personal Computer Interface.	4	4	2019
11.	What is Human Computer Interaction? Explain with one example.	4	5	-
12.	Write a short note on diversity of ICT device interaction.	4	5	-
13.	What is Personal Computer Interface? Explain.	4	5	-
14.	List the difference between Virtual Reality and Augmented Reality.	4	5	-
15.	Write a short note on Modelling users planned tasks and goals. Multiple user task and activity based computing	4	6	-

UNIT – V				
Q. No.	**Question**	**CO No.**	**Marks**	**University Year**
1.	Define and explain all ways of addressing privacy in ubiquitous system.	5	8	2018
2.	Explain Solove's Taxonomy of privacy with diagram.	5	8	2018
3.	Describe all privacy difficulties and challenges of RFID tag.	5	8	2018
4.	Describe all challenges to privacy for Ubiquitous Computing.	5	8	2018
5.	Explain Ubiquitous Computing privacy in detail.	5	8	2019
6.	What is legal background for maintaining Ubicomp privacy?	5	8	2019

7.	What is Interpersonal Privacy? Explain.	5	5	-
8.	Write a short note on Legal Mechanism.	5	5	-
9.	List and explain different data types and data accessibility.	5	5	-
10.	Explain the ways to protect RFID tags.	5	5	-
11.	Write a short note on RFID Security.	5	5	-
12.	Explain Collection Scale and Collection Manner with respect to Ubiquitous Computing.	5	8	-

UNIT – VI				
Q. No.	**Question**	**CO No.**	**Marks**	**University Year**
1.	Write short note on : Network protocol suits Routing and inter networking PSTN voice network Configuration management	6	12	2018
2.	Describe wireless data network with its types.	6	6	2018
3.	Write short note on: Personal Area Network Body Area Network	6	8	2018
4.	Explain multi path routing in Mobile Ad hoc Network (MANET) with neat diagram.	6	6	2018
5.	Explain Mesh network and Overlay network with diagram.	6	4	2018
6.	Explain Network Protocol Suites in detail.	6	6	2019
7.	Write a short note on Routing and Internetworking.	6	6	2019
8.	Explain PSTN voice network.	6	6	2019
9.	Write a short note on wireless data network (any three) WLAN and WIMAX, Bluetooth, ZigBee Infrared	6	12	2019
10.	Explain Service Oriented Network	6	6	2019
11.	Write a short note on Intelligent Networks.	6	5	-
12.	Write a short note on Satellite and Microwave communication.	6	5	-
13.	What is Power Line Communication? Explain.	6	5	-
14.	List and explain the difference between Mesh and Overlay Networks.	6	6	-
15.	What is SLA? Explain SLA management of services.	6	5	-

Unit Wise Home Assignment

Unit I

Sr. No.	Question	CO No.	Marks	University Year
1	Explain the importance of ubiquitous computing in everyday life.	1	5	2018, 2019
2	Compare Human ICT device interaction (HCI) with ICT device and Physical world interaction (CPI).	1	5	2019
3	Illustrate the key ubiquitous computing properties.	1	5	2019
4	Compare and explain 3 basic architectural design patterns for ubiquitous ICT system.	1	6	2018
5	Illustrate Ubiquitous System Environment Interaction with examples.	1	4	2018

Unit II

Sr. No.	Question	CO No.	Marks	University Year
1	Explain types of transparency mobile services.	2	5	2018
2	Explain in detail service provision life cycle.	2	6	2018
3	Explain smart devices under CPI and CCI.	2	5	2018
4	Explain the smart devices under iHCI and HPI.	2	4	2018
5	Illustrate 3 types of P2P system with a diagram.	2	5	-

Unit III

Sr. No.	Question	O No.	arks	University Year
	"Tagging the physical world", explain this concept with examples.	3	6	2018
	Explain Micro Actuation and Sensing (MEMS) with examples.	3	5	208
	Explain three major types of Robot and illustrate the significance of Robot Manipulators.	3	5	2018
	Explain RFID tags and its types.	3	6	2018
	Illustrate the significance of sensor network.	3	5	-

Unit IV

. No.	Question	CO No.	Mks	Univesity Year
1	How would you demonstrate Human Centered Design life cycle?	4	8	2018
2	How would you modify personal computer interfaces?	4	4	2019
3	How would you demonstrate user models and its acquisition and representation?	4	7	2018
4	How would you use Multi model visual interface, Tangible interface and Gesture interfaces? Explain.	4	9	2018
5	Identify different methods to acquire user input.	4	5	-

Unit V

Sr. No.	Question	CO No.	Marks	University Year
1	How would you explain all ways of addressing privacy in ubiquitous system?	5	8	2018
2	How would you explain privacy difficulties and challenges of RFID tags?	5	8	2018
3	How would you explain Solove's Taxonomy of privacy with diagram?	5	8	2018
4	What explanation do you have for "Privacy is same as Security"?	5	5	-
5	How is five quantum leap related and connected to ubicomp systems? Explain.	5	5	-

Unit VI

Sr. No.	Question	CO No.	Marks	University Year

1	What are Personal Area Network and Body Area Network?	6	8	2018
2	What is Mobile Ad hoc Network (MANET)? Explain with neat diagram.	6	6	2018
3	Define wireless data network with its types.	6	6	2018
4	List different controlling network access mechanism and explain any two.	6	5	-
5	Why Intelligent Network plays an important role in everyday life? Explain.	6	5	-

ADDITIONAL RESOURCES

1. https://www.makeuseof.com/tag/virtual-machine-makeuseof-explains/
2. https://internetofthingsagenda.techtarget.com/definition/pervasive-computing ubiquitous-computing
3. https://www.mems-exchange.org/MEMS/what-is.html
4. https://www.interaction-design.org/courses/human-computer-interaction
5. https://www.camcode.com/asset-tags/what-are-rfid-tags/
6. https://www.slideshare.net/HongseokKim3/ubicomp-privacy-no-notes
7. https://www.sciencedirect.com/topics/computer-science/ubiquitous-network

414464A Internet of Things

Teaching Scheme: **Credits:** 04 **Examination Scheme:**

Lectures: 3 Hours/Week In-Semester : 30 Marks

End-Semester: 70 Marks

Prerequisites:

1. Fundamentals of Communication and Computer Network
2. Computer Network Technology

Course Objectives :

1. To understand what is Internet of things
2. Describe architecture, Design, underlying technologies, platforms and cloud interface.

UNIT–I INTRODUCTION TO INTERNET OF THINGS 08 Hours

What is the Internet of Things? Internet of Things Definitions and Frameworks : IoT Definitions, IoT Architecture, General Observations, ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities, Physical Design of IoT: IoT Protocols, Logical Design of IoT: Functional block, communication Model, Communication API's, IoT Enabling Technologies: WSN, cloud computing, Big data Analytics, communication Protocols, Embedded systems, IoT levels and Deployment templates: Level 1 to Level 5

UNIT – II IoT NETWORK ARCHITECTURE AND DESIGN 08 Hours

The one M2M IoT Standardized Architecture, The IoT World Forum (IoTWF) Standardized Architecture, A Simplified IoT Architecture, IoT protocol stack, The Core IoT Functional Stack, IoT Data Management and Compute Stack: Fog Computing, Edge Computing, The Hierarchy of Edge, Fog, and Cloud IoT and M2M: Introduction to M2M, Difference between IoT and M2M, SDN and NFV for IoT

UNIT – III SMART OBJECTS: THE "THINGS" IN IoT 08 Hours

Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects: Communications Criteria, IoT Access Technologies: IEEE 802.15.4, IEEE 802.15.4g and 802.15.4e, IEEE 1901.2a, LoRaWAN

UNIT – IV ADDRESSING TECHNIQUES FOR THE IoT 08Hours

Address Capabilities, IPv6 Protocol Overview, IPv6 Tunneling, IPsec in IPv6, Header Compression Schemes, Quality of Service in IPv6, Migration Strategies to IPv6, Mobile IPV6 technologies for the IoT: Protocol Details, IPv6 over low-power WPAN (6LoWPAN)..

UNIT – V IoT PLATFORMS 08 Hours

What is an IoT Device, Exemplary Devices: Raspberry Pi, Raspberry Pi Interfaces, Other IoT Devices: pcDuino, BeagleBone Black ,CubieBoard, ARDUINO

UNIT – VI IoT PHYSICAL SERVERS AND CLOUD OFFEREINGS 08 Hours

Introduction to cloud storage models and communication API's, WAMP-AutoBahn for IoT, Python web application framework, Designing a RESTful web API, AMAZON web services for IoT, SkyNet IoT messaging platform, IoT case studies: Home Automation, Cities, Environment

THEORY :

Text Books

1. Internet of Things: A Hands-On Approach Arshdeep Bahga, Vijay Madisetti VPT – Paperback 2015 978- 0996025515 628/- 2.
2. IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things David Hanes, Gonzalo Salgueiro, Patrick Grossetete Cisco Press – Paperback – 16
3. Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications Daniel Minoli Willy Publication s - 2013 978-1-118- 47347-4, 466

Reference Books

1. 1. Smart Internet of things projects Agus Kurniawan Packt - Sep 2016 978-1- 78646-651-8 2 The Internet of Things Key Olivier Willy Publication 2nd Edition 978
2. Applications and protocols Hersent s 119- 99435-0, 3 The Internet of Things Connecting Objects to the Web Hakima Chaouchi, Willy Publications 978-1- 84821- 140-7
3. Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications Daniel Minoli Willy Publication s - 2013 978-1-118- 47347-4, 466

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit/ Assignment	Assessment Technique	Blooms Taxonomy Category
CO414464A.1	Explain what Internet of Things is.	1	PRE-INSEM	Understand
CO414464A.2	Explain architecture and design of IoT.	2	PRE-INSEM	Understand
CO414464A.3	Describe the objects connected in IoT.	3	PRE-INSEM	Understand
CO414464A.4	Understand the Underlying Technologies.	4	PRE-ENDSEM	Understand
CO414464A.5	Understand the platforms in IoT.	5	PRE-ENDSEM	Understand
CO414464A.6	Understand the cloud interface to IoT.	6	PRE-ENDSEM	Understand

PREREQUISITES

Sr. No.	Unit	Prerequisite subject name
1.	INTRODUCTION TO INTERNET OF THINGS	Fundamentals of Communication and Computer Network
2.	IoT NETWORK ARCHITECTURE AND DESIGN	Fundamentals of Communication and Computer Network
3.	SMART OBJECTS: THE "THINGS" IN IoT	Computer Network Technology
4.	ADDRESSING TECHNIQUES FOR THE IoT	Computer Network Technology
5.	IoT PLATFORMS	Computer Network Technology
6.	IoT PHYSICAL SERVERS AND CLOUD OFFEREINGS	Computer Network Technology

TEACHING PLAN

Teaching Plan Short

Academic Year:- 2020-21 Semester :-II w. e. f. :- 21.01.2021

Class : - BE Division: A & B

Subject :- IOT Subject Code :- 414464A

Faculty In charge :- Mrs. Sampada A. Kulkarni No. of Lectures/ weeks: 3

- **Lecture Plan (Considering Online Sessions due to Pandemic)**

Sr. No.	Unit No.	Unit/ Topic Name	Start Date	End Date
1.	I	INTRODUCTION TO INTERNET OF THINGS	Jan Week 4	Feb Week 2
2.	II	IoT NETWORK ARCHITECTURE AND DESIGN	Feb Week 2	Feb Week 4
3.	III	SMART OBJECTS: THE "THINGS" IN IoT	Feb Week 4	March Week 3
4.	IV	ADDRESSING TECHNIQUES FOR THE IoT	March Week 3	March Week 5
5.	V	IoT PLATFORMS	March Week 5	April Week 2
6.	VI	IoT PHYSICAL SERVERS AND CLOUD OFFEREINGS	April Week 2	April Week 5

Detail Teaching Plan (Both Shifts)

Lect. No	Unit No.	Main Topic to be Covered	Sub Topics to be Covered	Chap. No. & Reference Books	CO to Attain	Measurable to attain CO	Mode of Delivery
1	UNIT - I	INTRODUCTION TO INTERNET OF THINGS	What is the Internet of Things?	TB-1: Internet of Things: A Hands-On Approach ; Arshdeep Bahga, Vijay Madisetti TB-3: Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications Daniel Minoli ; Willy Publications	CO414464 A.1	PRE-INSEM	PPT
2			Internet of Things Definitions and Frameworks : IoT Definitions, IoT Architecture, General Observations,				PPT
3			ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities,				PPT
4			Physical Design of IoT: IoT Protocols,				PPT
5			Logical Design of IoT: Functional block, communication Model, Communication API's,				PPT
6			IoT Enabling Technologies: WSN, cloud computing, Big data Analytics,				PPT
7			communication Protocols, Embedded systems,				PPT
8			IoT levels and Deployment templates: Level 1 to Level 5				PPT
9		IoT NETWORK	The one M2M IoT Standardized Architecture	TB-1 : Internet of Things: A Hands-			PPT

10	UNIT - II	ARCHITECTURE AND DESIGN	The IoT World Forum (IoTWF) Standardized Architecture, A Simplified IoT Architecture,	On Approach Arshdeep Bahga, Vijay Madisetti TB-2. IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things David Hanes, Gonzalo Salgueiro, Patrick Grossetete Cisco Press – Paperback.	CO414464 A.2	PRE-INSEM	PPT
11			IoT protocol stack, The Core IoT Functional Stack,				PPT
12			IoT Data Management and Compute Stack: Fog Computing, Edge Computing,				PPT
13			IoT Data Management and Compute Stack: The Hierarchy of Edge, Fog,				PPT
14			and Cloud IoT and M2M: Introduction to M2M,				PPT
15			Difference between IoT and M2M,				PPT
16			SDN and NFV for IoT				PPT
17	UNIT - III	SMART OBJECTS: THE “THINGS” IN IoT	Sensors, Actuators,	TB-2. IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things David Hanes,	CO414464 A.3	PRE-INSEM	PPT
18			Smart Objects, Sensor Networks,				PPT
19			Connecting Smart Objects: Communications Criteria,				C PPT

20			IoT Access Technologies: IEEE 802.15.4,	Gonzalo Salgueiro, Patrick Grossetete Cisco Press – Paperback.			PPT
21			IEEE 802.15.4g in deatils				PPT
22			802.15.4e with architecture and detail				PPT
23			IEEE 1901.2a,				PPT
24			LoRaWAN				PPT
25	UNIT - IV	ADDRESSING TECHNIQUES FOR THE IoT	Address Capabilities, IPv6 Protocol Overview,	TB-3: Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications Daniel Minoli ; Willy Publications	CO414464 A.4	PRE-ENDSEM	PPT
26			IPv6 Tunneling, IPsec in IPv6,				PPT
27			IPsec in IPv6				PPT
28			Header Compression Schemes,				PPT
29			Quality of Service in IPv6				PPT
30			Migration Strategies to IPv6				PPT
31			Mobile IPV6 technologies for the IoT: Protocol Details,				PPT
32			IPv6 over low-power WPAN (6LoWPAN).				PPT
33	UNIT - V		What is an IoT Device, and its types, different platforms	TB-1: Internet of Things: A Hands-	CO414464 A.5	PRE-ENDSEM	PPT

34			Exemplary Devices: Raspberry Pi , pin diagram ,	On Approach ; Arshdeep Bahga, Vijay Madisetti RB-1 Smart Internet of things projects Agus Kurniawan Packt - Sep 2016 978-1-78646- 651-8 2 The Internet of Things Key Olivier Willy Publication			PPT
35			Raspberry Pi Interfaces , operating system , connectivity.				PPT
36			Other IoT Devices: pcDuino and its working principle				PPT
37			BeagleBone Black : its working condition , interfacing,				PPT
38			CubieBoard : its working condition , interfacing,				PPT
39			ARDUINO: its working condition , interfacing,				PPT
40			Differences between: Raspberry Pi, pcDuino, BeagleBone Black ,CubieBoard, ARDUINO				PPT
41	UNIT – VI	IoT PHYSICAL SERVERS AND CLOUD OFFEREINGS	Introduction to cloud storage models and communication API's	TB-1: Internet of Things: A Hands-On Approach ; Arshdeep Bahga, Vijay Madisetti	CO414464 A.6	PRE-ENDSEM	PPT
42			models and communication API's,				PPT
43			WAMP-AutoBahn for IoT, Python web application framework,				PPT
44			Designing a RESTful web API,				PPT

45			SkyNet IoT messaging platform,			PPT
46			IoT case studies: Cities,			PPT
47			IoT case studies: Home Automation,			PPT
48			IoT case studies: Environment			PPT

UNIT WISE QUESTION BANK

UNIT-I: INTRODUCTION TO INTERNET OF THINGS

Sr. No	Question	CO No.	Marks	University Year
1	Write short note on : Overview and motivation for Internet of Things	CO414464A.1	6	
2	Discuss area development and standardization in Internet of Things	CO414464A.1	4	
3	Discuss any two example of Internet of Things	CO414464A.1	4	
4	Explain in detail History and overview of IoT	CO414464A.1	6	
5	Explain HLSA IoT Framework	CO414464A.1	6	
6	Discuss area development and standardization in Internet of Things	CO414464A.1	6	
7	What types of things get connected in IoT	CO414464A.1	6	
8	Explain the IoT Architecture with neat diagram	CO414464A.1	8	
9	What is IoT. List application of IoT	CO414464A.1	6	
10	What are key technologies for Internet of Things	CO414464A.1	8	

UNIT-II: IoT NETWORK ARCHITECTURE AND DESIGN

Sr. No	Question	CO No.	Marks	University Year
1	Explain OneM2M architecture in detail along with diagram.	CO414464A.2	6	
2	What are the differences between SDN and NFV?	CO414464A.2	4	
3	List and Explain core IoT functional stack along with its	CO414464A.2	6	

	sub layer.			
4	What are the differences between SDN and NFV?	CO414464A.2	4	
5	Explain IoT World Forum (IoTWF) Standardized Architecture in detail along with diagram.	CO414464A.2	6	
6	Explain IoT protocol stack .	CO414464A.2	4	
7	What are the differences between IoT and M2M?	CO414464A.2	6	
8	Explain IoT Data Management and Compute Stack in detail along with diagram.	CO414464A.2	8	
9	Explain A Simplified IoT Architecture in detail along with diagram.	CO414464A.2	6	
10	Explain the Core IoT Functional Stack	CO414464A.2	4	

UNIT III: SMART OBJECTS: THE "THINGS" IN IoT

Sr. No	Question	CO No.	Marks	University Year
1	Define smart connecting objects and its types.	CO414464A.3	6	
2	Define IEEE 802.5a.4 technology.	CO414464A.3	4	
3	Explain and enlist types of sensors and actuators.	CO414464A.3	6	
4	Explain connecting Smart Objects: Communications Criteria	CO414464A.3		
5	What is Sensor Networks?	CO414464A.3		
6	Write a short note on : Sensors Actuators	CO414464A.3		

	Smart Objects			
7	Define IEEE 802.15.4g and 802.15.4e Technology.	CO414464A.3		
8	Explain LoRaWAN in detail.	CO414464A.3		
9	Explain IEEE 1901.2a in detail.	CO414464A.3		
10	Write a short note on : IEEE 802.15.4g 802.15.4e	CO414464A.3		

UNIT IV: ADDRESSING TECHNIQUES FOR THE IoT

Sr. No	Question	CO No.	Marks	University Year
1	What are The Limitation Of Ipv4?	CO414464A.4	4	
2	Explain IPv6 header format and give IPv6 Protocol Overview.	CO414464A.4	4	
3	Explain IPv6 Tunneling.	CO414464A.4	6	
4	Write a short note on : IPv6 Tunneling IPsec in IPv6.	CO414464A.4	8	
5	Write a short note on Quality of Service in IPv6.	CO414464A.4	5	
6	Explain Migration Strategies to IPv6 in detail.	CO414464A.4	6	
7	Explain in detail mobile IPV6 technologies for the IoT.	CO414464A.4	6	
8	Write a short note on IPv6 over low-power WPAN (6LoWPAN).	CO414464A.4	6	
9	Explain Header Compression Schemes.	CO414464A.4	4	

10	What are The Difference Between Ipv4 And Ipv6?	CO414464A.4	4	

UNIT-V: IoT PLATFORMS

Sr. No	Question	CO No.	Marks	University Year
1	What are the difference exists between Raspberry Pi and ARDUINO.	CO414464A.5	8	
2	What is an IoT Device?	CO414464A.5	6	
3	Explain different types of IoT device.	CO414464A.5	5	
4	Explain in detail Raspberry Pi Interfaces.	CO414464A.5	6	
5	Write a short on: pcDuino BeagleBone Black CubieBoard	CO414464A.5	9	
6	What are the uses of API's in cloud services?	CO414464A.5	6	
7	Explain in detail SkyNet IoT messaging platform.	CO414464A.5	5	

UNIT VI: IoT PHYSICAL SERVERS AND CLOUD OFFEREINGS

Sr. No	Question	CO No.	Marks	University Year
1	Compare Cloud and On-premise Computing?	CO414464A.6	4	
2	Explain a RESTful web API.	CO414464A.6	6	
3	Explain WAMP stack serever stack in detail	CO414464A.6	4	
4	Write a short on AMAZON web services for IoT	CO414464A.6	4	
5	Explain in detail Python web application framework.	CO414464A.6	6	

6	Explain cloud storage models and communication API's.	CO414464A.6	6	
7	Write a short on Home Automation IoT case study.	CO414464A.6	6	
8	Write a short on following IoT case studies: Environment Cities	CO414464A.6	8	
9	Explain WAMP-AutoBahn for IoT.	CO414464A.6	6	
10	Write down the steps involved in connecting IoT device to AMAZON web API	CO414464A.6	9	

HOME ASSIGNMENT QUESTIONS

UNIT-I: INTRODUCTION TO INTERNET OF THINGS

Sr. No	Question	CO No.	Marks	University Year
1	How would you summarise the Overview and motivation for Internet of Things	CO414464A.1	6	
2	Can you write in your own words the area of development and standardization in Internet of Things	CO414464A.1	4	
3	Discuss any two application of Internet of Things	CO414464A.1	4	
4	How would you summarise the History and overview of IoT	CO414464A.1	6	
5	Can you write a brief outline of HLSA IoT Framework	CO414464A.1	6	
6	Discuss area development and standardization in Internet of Things	CO414464A.1	6	
7	Can you provide an example of what types of things get connected in IoT	CO414464A.1	6	
8	Can you write a brief outline of the IoT Architecture with neat diagram	CO414464A.1	8	
9	What is meant by IoT. List application of IoT	CO414464A.1	6	
10	Can you explain what are key technologies for Internet of Things	CO414464A.1	8	

UNIT-II: IoT NETWORK ARCHITECTURE AND DESIGN

Sr. No	Question	CO No.	Marks	University Year
1	Can you write a brief outline of OneM2M architecture in detail along with diagram?	CO414464A.2	6	
2	What are the differences exists between SDN and NFV?	CO414464A.2	4	
3	List and Explain core IoT functional stack along with its	CO414464A.2	6	

	sub layer.			
4	What are the differences exists between SDN and NFV?	CO414464A.2	4	
5	Can you write a brief outline of IoT World Forum (IoTWF) Standardized Architecture in detail along with diagram?	CO414464A.2	6	
6	How would you summaries IoT protocol stack.	CO414464A.2	4	
7	Can you distinguish between IoT and M2M?	CO414464A.2	6	
8	What was the main idea of IoT Data Management and Compute Stack in detail along with diagram?	CO414464A.2	8	
9	What can you say about a Simplified IoT Architecture in detail along with diagram?	CO414464A.2	6	
10	What was the main idea of the Core IoT Functional Stack	CO414464A.2	4	

UNIT III: SMART OBJECTS: THE "THINGS" IN IoT

Sr. No	Question	CO No.	Marks	University Year
1	Can you provide an example of smart connecting objects and its types?	CO414464A.3	6	
2	How would you summaries IEEE 802.5a.4 technology.	CO414464A.3	4	
3	What is the main idea of sensors and actuators and enlist its types.	CO414464A.3	6	
4	Can you explain what is Communications Criteria for connecting Smart Objects	CO414464A.3	4	
5	Can you explain what Sensor Networks is?	CO414464A.3	6	
6	What is the main idea of : Sensors Actuators Smart Objects	CO414464A.3	9	

7	How would you summaries IEEE 802.15.4g and 802.15.4e Technology.	CO414464A.3	6	
8	Can you explain what is LoRaWAN in detail.	CO414464A.3	6	
9	Can you explain what IEEE 1901.2a in detail is?	CO414464A.3	5	
10	What is the main idea of : IEEE 802.15.4g 802.15.4e	CO414464A.3	8	

UNIT IV: ADDRESSING TECHNIQUES FOR THE IoT

Sr. No	Question	CO No.	Marks	University Year
1	Can you explain what The Limitation Of Ipv4 are?	CO414464A.4	4	
2	Can you write a brief outline of IPv6 header format and give IPv6 Protocol Overview.	CO414464A.4	4	
3	Can you write a brief outline of IPv6 Tunneling?	CO414464A.4	6	
4	What is the main idea of : IPv6 Tunneling IPsec in IPv6.	CO414464A.4	8	
5	Can you explain what Quality of Service in IPv6 is?	CO414464A.4	5	
6	Can you write a brief outline of Migration Strategies to IPv6 in detail?	CO414464A.4	6	
7	How would you summaries mobile IPV6 technologies for the IoT.	CO414464A.4	6	
8	Can you write a brief outline of IPv6 over low-power WPAN (6LoWPAN).	CO414464A.4	6	
9	What is the main idea of header Compression Schemes?	CO414464A.4	4	
10	Can you distinguish between Ipv4 And Ipv6?	CO414464A.4	4	

UNIT-V: IoT PLATFORMS

Sr. No	Question	CO No.	Marks	University Year
1	What are the difference exists between Raspberry Pi and ARDUINO.	CO414464A.5	8	
2	How would you classify the types of IoT Device?	CO414464A.5	6	
3	Explain different types of IoT device.	CO414464A.5	5	
4	What is the main idea of Raspberry Pi Interfaces?	CO414464A.5	6	
5	What is the main idea of: pcDuino BeagleBone Black CubieBoard	CO414464A.5	9	
6	What can you say about uses of API's in cloud services?	CO414464A.5	6	
7	What can you say about in detail SkyNet IoT messaging platform.	CO414464A.5	5	

UNIT VI: IoT PHYSICAL SERVERS AND CLOUD OFFEREINGS

Sr. No	Question	CO No.	Marks	University Year
1	Can you distinguish between Cloud and On-premise Computing?	CO414464A.6	4	
2	What can you say about a RESTful web API.	CO414464A.6	6	
3	Can you explain what WAMP stack server in detail is.	CO414464A.6	4	
4	Write can you say about AMAZON web services for IoT	CO414464A.6	4	
5	How would you summaries Python web application framework.	CO414464A.6	6	

6	How would you summaries cloud storage models and communication API's.	CO414464A.6	6	
7	Can you write in your own words Home Automation IoT case study?	CO414464A.6	6	
8	What can you say about following IoT case studies: Environment Cities	CO414464A.6	8	
9	Can you explain what is WAMP-AutoBahn for IoT.	CO414464A.6	6	
10	How would you summaries the steps involved in connecting IoT device to AMAZON web API	CO414464A.6	9	

ADDITIONAL RESOURCES

http://mqtt.org/

https://dzone.com/articles/coap-protocol-step-by-step-guide

https://aws.amazon.com/iot/

https://cloud.google.com/solutions/iot/

https://www.elprocus.com/building-the-internet-of-things-using-raspberry-pi/

414464 D (Elective-III) Internet and Web Programming

SYLLABUS

Teaching Scheme:	Credits	Examination Scheme:
Lectures: 3 Hours/Week	04	In-Semester : 30 Marks End-Semester: 70 Marks

UNIT I INTERNET AND WEB PROGRAMMING ESSENTIALS	8 Hrs

The Internet, Introduction Basic Internet Protocol, The World Wide Web, Introduction to Web Programming, Web Clients, Web Servers, Browser and Search Engines. Markup Languages : Introduction to HTML, Static and dynamic HTML, Structure of HTML documents, HTML Elements, Linking in HTML, Anchor Attributes, Image Maps, Meta Information, Image Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and layers, Audio and Video Support with HTML Database integration, , Forms Control, Form Elements, Applying Styles, values, selectors, class, ids, inheritance, layout, backgrounds, borders, margin, padding, lists, fonts, text formatting, positioning. HTML5. Introduction to Style Sheet, Inserting CSS in an HTML page, CSS selectors, Introduction to XML, XML key component, Transforming XML into XSLT, DTD: Schema, elements, attributes, Introduction to JSON.

UNIT II CLIENT SIDE PROGRAMMING	8 Hrs

JavaScript: Overview of JavaScript, using JS in an HTML (Embedded, External), Data types, Control Structures, Arrays, Functions and Scopes, Objects in JS, DOM: DOM levels, DOM Objects and their properties and methods, Manipulating DOM, JQuery: Introduction to JQuery, Introduction to AJAX, Working of AJAX, AJAX processing steps, coding AJAX script. Introduction to Angular JS.

UNIT III SERVER SIDE PROGRAMMING	8 Hrs

Introduction to Server Side technology and TOMCAT, Servlet: Introduction to Servlet, need and advantages, Servlet Lifecycle, Creating and testing of sample Servlet, session management. JSP: Introduction to JSP, advantages of JSP over Servlet, elements of JSP page: directives, comments, scripting elements, actions and templates, JDBC Connectivity with JSP. PHP: Introduction to PHP, Features, PHP script, PHP syntax, conditions & Loops, Functions, String manipulation, Arrays & Functions, Form handling, Cookies & Sessions, using MySQL with PHP.

UNIT IV WEB SERVICES AND CONTENT MANAGEMENT SYSTEMS	8 Hrs

Introduction to Web Services, Web Services Architecture, XML Messaging, SOAP, WSDL, UDDI, REST, Java Web Services, Amazon Web Services, DevOps , Introduction to Content

Management System(CMS) ,Wordpress / Joomala, Advanced Technology: Bootstrap, JSF, Spring.

UNIT V MOBILE WEB DEVELOPMENT 8 Hrs

What is Mobile Web? Understanding Mobile Devices, Mobile Data Usage, Mobiles and Desktops, Building an HTML page, Getting jQuery Mobile, Implementing jQuery Mobile, Working with data attributes, Working with jQuery Mobile Pages, Enhancing Pages with Headers, Footers, and Toolbars; Working with Lists, Building a Simple Mobile Website, Working with Forms and jQuery Mobile, Creating Modal Dialogs and Widgets, Creating Grids, Panels, and Other Widgets; jQuery Mobile Configuration, Utilities, and JavaScript Methods; Working with Events.

UNIT VI WEB SECURITY AND CYBER ETHICS 8 Hrs

Overview of Web Security: Need of Web Security, Breach of Web Security, What need to be Secure on Web? Can Web be secure? Aspects of Web Security, Purpose of Web Security, A Security Equation, Defining Security Equation, Common Threats on Web, User level Security, Server Level Security, Cyber ethics, Issues in Cyber ethics.

Text Books

Kogent Learning Solutions Inc,Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition ,ISBN: 9788177228496

1. Raymond Camden, Andy Matthews, jQuery Mobile Web Development Essentials, Packt Publishing, Second Edition, 9781782167891
2. Ethan Cerami, Web Services Essentials, O'Reilly Media, First Edition, 0-596-00224-6
3. ShwetaBhasin, Web Security Basics, Premier Press, First Edition, ISBN:l978-1592000067

Reference Books

1. Dr.Hiren Joshi, Web Technology and Application Development, DreamTech, First,ISBN:978- 93- 5004-088-1 2. Santosh Kumar K., DT Editorial Services,Black Book, JDBC 4.
2. Servlet 3.1 & JSP 2.3,Dreamtech Press, Second Edition, ISBN:978-8177228700
3. Steven M. Schafer, “HTML, XHTML and CSS”, Wiley India Edition, Fourth Edition, 978- 81- 265-1635-3
4. B. V. Kumar, S. Sangeetha, S.V. Subrahmanya, J2EE Architecture, an illustrative gateway to enterprise solutions, Tata McGraw Hill Publishing Company, Second Edition, ISBN:978-0- 070-621-633

5. Ivan Bayross, "Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP,BPB Publications,4th Edition,ISBN:978-8183330084
6. Brain Fling, Mobile Design and Development, O'REILLY, First Edition, ISBN:13:978-81-8404- 817-9
7. Jason Hunter, Java Servlet Programming, O'reilly Publications, 2nd Edition, ISBN: 978-0-596- 00040-0 8. Adam Bretz& Colin J Ihrig, Full Stack Javascript Development with EAN, SPD, First Edition, ISBN:978-0992461256

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit	Assessment Technique	Blooms Taxonomy Category
C414464D.1	Illustrate static website using basic tools	I	Pre InSem Test	L2-Understanding
C414464D.2	Develop client side programming skills.	II		L3-Applying
C414464D.3	Develop server side programming skills.	III		L3-Applying
C414464D.4	Illustrate web services and handle content management tools.	IV	Pre EndSem Test	L2-Understanding
C414464D.5	Develop application website for mobile using mobile web development tools.	V		L3-Applying
C414464D.6	Explain aspects of web security and cyber ethics.	VI		L2-Understanding

PREREQUISITES

Sr. No.	Unit Number	Prerequisite subject name
1	I	Software Lab III
2	II	
3	III	
4	IV	
5	V	
6	VI	

TEACHING PLAN

Academic Year: 2020-21 Semester: VIII w. e. f. :- 21-1-2021

Class: BE IT Division: A&B

Subject: Internet Web Programming Subject Code: 414464D

Faculty In charge: Mrs. Jyoti Jadhav No. of Lectures/ weeks: 3 Hours/Week

- **Lecture Plan**

Sr. No.	Unit No.	Unit/ Topic Name	Start Date	End Date
1.	I	INTERNET AND WEB PROGRAMMING ESSENTIALS	1st week Jan 2020	3nd week Jan 2020
2.	II	CLIENT SIDE PROGRAMMING	3rd week Jan 2020	2st week Feb 2020
3.	III	SERVER SIDE PROGRAMMING	2nd week Feb 2020	4th week Feb 2020
4.	IV	WEB SERVICES AND CONTENT MANAGEMENT SYSTEMS	4stWeek of Feb 2020	2th week March 2020
5.	V	MOBILE WEB DEVELOPMENT	2rd week March 2020	4th week March 2020
6.	VI	WEB SECURITY AND CYBER ETHICS	1st week April2020	3nd week April2020

- **Practical Plan**

Sr. No.	Assignment No.	Assignment Title	Start Date	End Date
1.	Assignment 1 1.1	Using HTML5 layout tags develop informative page with sections which include various images, links to other pages for navigation, make use of all possible formatting (for example font, color etc.).	1st week Jan 2020	3nd week Jan 2020
2	1.2	Apply CSS properties Border, margins, Padding, Navigation, dropdown list to page created in first assignment.	3rd week Jan 2020	2st week Feb 2020
3	Assignment 2	Design an online registration form for any application and validate it using JQuery	2nd week Feb 2020	4th week Feb 2020
4	Assignment 3	Design Login Application using PHP and add essence of Ajax in it	4stWeek of Feb 2020	2th week March 2020
5	Assignment 4	Create any Java Web Service and integrate it with any suitable application	2rd week March 2020	4th week March 2020
6	Assignment 5	Create JSP login page and validate it. Make use of Servelets Assignment 6	1st week April2020	3nd week April2020
7	Assignment 6	Create an application for bill payment using Angular JS	1st week Jan 2020	3nd week Jan 2020
8	Assignment 7	Develop website using any CMS tool which falls into one of the categories blog, social networking, News updates, Wikipedia, E-commerce store.Use at list HTML5, PHP, CSS/Bootstrap, JavaScript web technologies. No database Website must include home page, and at least 3	3rd week Jan 2020	2st week Feb 2020
9	Assignment 8	Develop Mini Project using any front end tool with database connectivity	2nd week Feb 2020	4th week Feb 2020

Detail Teaching Plan

Lect . No	Unit No.	Unit	Sub Topics to be Covered	Chap. No. & Reference Books	CO to Attain	Measurable to attain CO	Mode of Delivery
1	I	INTRODUCTION	The Internet, Introduction Basic Internet Protocol, The World Wide Web, Introduction to Web Programming, Web Clients, Web Servers, Browser and Search Engines.	Part I & II Kogent Learning Solutions Inc,Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition	C414464D.1	Pre InSem Test	Chalk and Talk/PPT
2			Markup Languages: Introduction to HTML, Static and dynamic HTML, Structure of HTML documents, HTML Elements, Linking in HTML, Anchor Attributes, Image Maps, Meta Information, Image Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and layers,				Chalk and Talk/PPT
3			Audio and Video Support with HTML Database integration, Forms Control, Form Elements				Chalk and Talk/PPT
4			Applying Styles, values, selectors, class, ids, inheritance, layout, backgrounds				Chalk and Talk/PPT
5			Borders, margin, padding, lists, fonts, text formatting, positioning. HTML5.				Chalk and Talk
6			Introduction to Style Sheet, Inserting CSS in an HTML page, CSS selectors				Chalk and Talk/PPT

7			Introduction to XML, XML key component, Transforming XML into XSLT				Chalk and Talk/PPT
8			DTD: Schema, elements, attributes, Introduction to JSON.				Chalk and Talk/PPT
9	**II**	**UNIT II CLIENT SIDE PROGRAMMING**	JavaScript: Overview of JavaScript, using JS in an HTML (Embedded, External),	Part IV Kogent Learning Solutions Inc,Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition	C414464D.2	Pre InSem Test	Chalk and Talk/PPT
10			Data types, Control Structures, Arrays, Functions and Scopes				Chalk and Talk/PPT
11			Objects in JS, DOM: DOM levels,				Chalk and Talk/PPT
12			DOM Objects and their properties and methods, Manipulating DOM				Chalk and Talk/PPT
13			JQuery: Introduction to JQuery,				Chalk and Talk/PPT
14			Introduction to AJAX, Working of AJAX,				Chalk and Talk/PPT
15			AJAX processing steps, coding AJAX script.				Chalk and Talk/PPT
16			Introduction to Angular JS.				Chalk and Talk/PPT

17	**III**	**SERVER SIDE PROGRAMMING**	Introduction to Server Side technology and TOMCAT, Servlet:	Chapter 37 Kogent Learning Solutions Inc,Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition	C414464D.3	Pre InSem Test	Chalk and Talk/PPT
18			Introduction to Servlet, need and advantages, Servlet Lifecycle				Chalk and Talk/PPT
19			Creating and testing of sample Servlet, session management. JSP:				Chalk and Talk/PPT
20			Introduction to JSP, advantages of JSP over Servlet, elements of JSP page: directives, comments, scripting elements, actions and templates				Chalk and Talk/PPT
21			JDBC Connectivity with JSP				Chalk and Talk/PPT
22			PHP: Introduction to PHP, Features, PHP script, PHP syntax, conditions & Loops				Chalk and Talk/PPT
23			Functions, String manipulation, Arrays & Functions, Form handling, Cookies &				Discussion
24			Sessions, using MySQL with PHP.				
25			Introduction to Web Services, Web Services Architecture				Chalk and Talk/PPT
26			XML Messaging, SOAP,				Chalk and Talk/PPT

27	**IV**	**WEB SERVICES AND CONTENT MANAGEMENT SYSTEMS**	WSDL, UDDI, REST,	Ethan Cerami, Web Services Essentials, O'Reilly Media, First Edition	C414464D.4	Pre EndSem Test	Chalk and Talk/PPT
28			Java Web Services				Chalk and Talk/PPT
29			Amazon Web Services, DevOps ,				Chalk and Talk/PPT
30			Introduction to Content Management System(CMS) ,Wordpress / Joomala,				Chalk and Talk/PPT
31			Advanced Technology: Bootstrap,				Chalk and Talk/PPT
32			JSF, Spring.				
33	**V**	**MOBILE WEB DEVELOPMENT**	What is Mobile Web? Understanding Mobile Devices, Mobile Data Usage, Mobiles and Desktops,	Raymond Camden, Andy Matthews, jQuery Mobile Web Development Essentials, Packt Publishing, Second Edition	C414464D.5	Pre EndSem Test	Chalk and Talk/PPT
34			Building an HTML page, Getting jQuery Mobile,				Chalk and Talk/PPT
35			Implementing jQuery Mobile, Working with data attributes, Working with jQuery Mobile Pages,				Chalk and Talk/PPT
36			Enhancing Pages with Headers, Footers, and Toolbars;				Chalk and Talk/PPT

37			Working with Lists, Building a Simple Mobile Website,				Chalk and Talk/PPT
38			Working with Forms and jQuery Mobile, Creating Modal Dialogs and Widgets, Creating Grids, Panels, and Other Widgets;				Chalk and Talk/PPT
39			jQuery Mobile Configuration, Utilities, and JavaScript Methods; Working with Events.				Chalk and Talk/PPT
40							
41	**VI**	**WEB SECURITY AND CYBER ETHICS**	Overview of Web Security: Need of Web Security	Shweta Bhasin, Web Security Basics, Premier Press, First Edition	C414464D.6	Pre EndSem Test	Chalk and Talk/PPT
42			Breach of Web Security				Chalk and Talk/PPT
43			What need to be Secure on Web? Can Web be secure?				Chalk and Talk/PPT
44			Aspects of Web Security, Purpose of Web Security,				Chalk and Talk/PPT
45			A Security Equation, Defining Security Equation, Common				Chalk and Talk/PPT
46			Threats on Web, User level Security,				Chalk and Talk/PPT
47			Server Level Security, Cyber ethics, Issues in Cyber ethics.				PPT

UNIT WISE QUESTION BANK

Unit I

Sr. No.	Question	CO No.	Marks	University Year
1	What are characteristics of Rich Internet Application?	C414464D.1	5	
2	Create a HTML page showing a message "I use media query". Write media query such that the text color changes light gray when browser window is 600px wide or less and otherwise it is black.	C414464D.1	5	
3	Explain with proper syntax and example how to use different types of CSS selectors.	C414464D.1	10	
4	Explain <audio>, <video> and <canvas> element in HTML5.	C414464D.1	10	
5	How to perform validation in DTD?	C414464D.1	5	

Unit II

Sr. No.	Question	CO No.	Marks	University Year
1	What is Ajax? Explain its Disadvantages?	C414464D.2	5	
2	How to authorize specific users in web.config file? Explain with example.	C414464D.2	5	
3	Explain Accordion in ASP.NET Ajax Control Toolkit.	C414464D.2	5	
4	What is AJAX? Explain Timer Control and UpdatePanel control with suitable example.	C414464D.2	5	
5	Explain Window object of JavaScript DOM.	C414464D.2	5	

Unit III

Sr. No.	Question	CO No.	Marks	University Year
1	Explain how session management is done in PHP.	C414464D.3	5	
2	Explain string function in PHP.	C414464D.3	5	
3	How can we refresh automatically when new data has entered the database?	C414464D.3	5	
4	What is life cycle of Servlet?	C414464D.3	5	
5	What is the difference between Servlet Request and Servlet Context when calling a Request Dispatcher?	C414464D.3	5	

Unit IV

Sr. No.	Question	CO No.	Marks	University Year
1	What is Web Service? Explain UDDI, SOAP and WSDL with respect to web services.	C414464D.4	10	
2	Differentiate between REST and SOAP.		5	
3	Explain the concept, purpose and benefits of Content Management System?		7	
4	Explain below functions in CMS a. is_page() b. wp_nav_menu() c. wp_list_page() d. get_excerpt() e. is_category() f. the_title() g. the_content() h. the_time()		8	
5	Explain why to choose Bootstrap for building the websites?		5	

Unit V

Sr. No.	Question	CO No.	Marks	University Year
1	What is jQuery and why it is needed?	C414464D.5	5	
2	Whether jQuery HTML work for both HTML and XML documents?	C414464D.5	5	
3	Explain what the following code will do: $("div#first, div.first, ol#items > [name$='first']")	C414464D.5	5	
4	What's the deal with the $ in jQuery? What is it and what does it mean?Also, how can jQuery be used in conjunction with another JavaScript library that also uses $ for naming?	C414464D.5	7	

Unit VI

Sr. No.	Question	CO No.	Marks	University Year
1	What are the ways in which attackers can infiltrate the system?	C414464D.6	5	
2	What is the fail-safe approach?	C414464D.6	5	
3	What is the use of infinite file in Web Security?	C414464D.6	5	
4	What are the conditions kept in mind before defining the file?	C414464D.6	5	
5	What does secure by default mean in Web Security?	C414464D.6	5	

UNITWISE HOME ASSIGNMENTS

Unit I

Sr. No.	Question	CO No.	Marks	University Year
1	Explain how to create and consume XML web service with web service architecture.	C414464D.1	10	
2	Explain various cross browser compatibility issues.	C414464D.1	10	
3	Create a HTML form that accepts first name, last name, department and designation from user.	C414464D.1	5	
4	How you define entities in DTD?	C414464D.1	5	
5	How we can store data in both child elements or attribute? Explain it.	C414464D.1	7	

Unit II

Sr. No.	Question	CO No.	Marks	University Year
1	What is AJAX? Explain Timer Control and UpdatePanel control with suitable example.	C414464D.2	10	
2	Write JavaScript code to change background color of web page automatically after every 5 second.	C414464D.2	5	
3	What is the main function of DOM?	C414464D.2	5	
4	What is Xml family?	C414464D.2	5	
5	What are the functionalities performed by Onload() And Onupload()?	C414464D.2	5	

Unit III

Sr. No.	Question	CO No.	Marks	University Year
1	Explain how to create, access, modify session variables in PHP.	C414464D.3	5	
2	What are the features added in Servlet 2.5?	C414464D.3	5	
3	What are the supporting protocols by HttpServlet? Explain each in detail.	C414464D.3	5	
4	What are the types of Session Tracking?	C414464D.3	5	
5	What are the important functions of filters and Servlet container?	C414464D.3	5	

Unit IV

Sr. No.	Question	CO No.	Marks	University Year
1	What is the difference between Web services and WCF?	C414464D.4	5	
2	What are the key components of Bootstrap?	C414464D.4	5	
3	Explain what pagination in bootstrap is and how they are classified?	C414464D.4	5	
4	What is the difference between Bootstrap and Foundation?	C414464D.4	5	
5	Explain what media object in Bootstrap is and what are their types?	C414464D.4	5	

Unit V

Sr. No	Question	CO No.	Marks	University Year
1	What are the four parameters used for jQuery Ajax method?	C414464D.5	8	
2	What are all the ways to include jQuery in a page?	C414464D.5	7	

3	Given the following HTML:
	
	and the following CSS:
	div#expander{
	width: 100px;
	height: 100px;
	background-color: blue;
	}
	Write code in jQuery to animate the #expander div, expanding it from 100 x 100 pixels to 200 x 200 pixels over the course of three seconds.
		C414464D.5	10	

4	What is method chaining in jQuery? Provide an example. What advantages does it offer?	C414464D.5	7	
5	Explain what the following code does: $("div").css("width", "300px").add("p").css("background-color", "blue");	C414464D.5	5	

Unit VI

Sr. No	Question	CO No.	Marks	University Year
1	What are the security features being provided in Web Security?	C414464D.6	5	
2	What is the function of Secure Socket Layer?	C414464D.6	5	
3	What are some of the preliminaries of Web Security?	C414464D.6	5	
4	What does Simplewebserver Object include?	C414464D.6	5	
5	What do you see as challenges to successfully deploying/monitoring Web Intrusion Detection?	C414464D.6	5	

ADDITIONAL RESOURCES

1. https://www.w3schools.com\
2. https://www.tutorialspoint.com
3. https://www.javatpoints.com\
4. https://www.geeksforgeeks.org/html-basics\
5. https://www.freecodecamp.com\
6. https://www.coursera.com\
7. https://www.treehouse.com\
8. https://www.codecademy.com\
9. https://www.htmldog.com\

414465A Rural Technologies and Community Development

SYLLABUS

UNIT I:	INTRODUCTION	**(7 Hours)**
RURAL DEVELOPMENT - Concepts and connotations, Basic Elements, Growth Vs. Development, Why rural development, Rising expectations and development, Development and Change, Human beings as cause and consequences of development. RURAL ECONOMY OF INDIA - Introduction, size and structure, The characteristics of rural sector, The role of agricultural sub-sector, The role of non-agricultural sub-sector, Challenges and opportunities.		
UNIT II:	RURAL DEVELOPMENT - MEASURES AND PARADIGMS	**(7 Hours)**
MEASURES OF DEVELOPMENT - Introduction, Measures of level of rural development, Measures of income distribution, Measures of development simplified, Concepts and measures of rural poverty. PARADIGMS OF RURAL DEVELOPMENT - Introduction, The modernization theory, The dependency theory of Marxist School, Rosenstein- Rodan's theory of 'Big Push', Lewis' model of economic development, The human capital model of development, The Gandhian Concept of Rural Development theories from other social sciences.		
UNIT III:	TECHNOLOGIES FOR RURAL DEVELOPMENT	**(7 Hours)**
Using Water Resources - The water cycle, Drinking Water, Water quality testing, Water filtering ,Extraction from Groundwater ,Pumps Rope and washer pump ,Manuel pumps, Treadle pump, Irrigation for agriculture, Channel systems, Sprinkler systems, Drip systems Water diversion ,Water storage Building Infrastructures and Creating Energy - Basic energy uses , Energy Sources - Firewood, Solar Energy, Hydroelectricity, Hydromechanical, Wind Energy, Energy Storage,Connecting to the Electrical Network, Environmental Considerations Use of ICT in Rural and agricultural development - Education, Healthcare, Agriculture, Business, Resource Mapping, Digital and Social Media Marketing Decision Support Systems for soil conservation and farm management Waste Management and Sanitation.		
UNIT IV:	COMMUNITY DEVELOPMENT	**(7 Hours)**

DEVELOPING COMMUNITIES - Introduction, Service Learning and community development, Theory and practice of community development, Community development issues. The diverse meaning of community development, The knowledge base of community development, International community development		
UNIT V:	COMMUNITY DEVELOPMENT - RURAL ENTREPRENEURSHIP	**(7 Hours)**
Different forms of Rural Entrepreneurship, Significance , Business planning for a new venture: the concept of planning paradigm, Forms of business enterprises-Sole proprietorship, partnership and corporations, Product and Process development, Marketing analysis and competitive analysis, strategies; Financial resources; debt financing, banks and financial institutions and other non-bank financial sources; Government programmes : direct loan assistance and subsidies; Industrial and legal issues for rural enterprises		
UNIT VI:	CASE STUDIES AND FIELD VISIT	**(7 Hours)**
Role of Micro-Finance institutions in rural development, Use of ICT in Rural development, Watershed Management - Water-Cup Competition by Paani Foundation, Community Safe Water Solutions, Visit to a 'Woman Self help group' nearby and study of its functioning and its role in development. Visit to model villages in nearby region - Ralegan-Siddhi, Dist - Ahemadnagar, Hiware Bazar Dist - Ahemadnagar, Tikekarwadi - Dist. - Pune, Buchekarwadi Dist- Pune etc.		

Teaching Scheme:	**Credits**	**Examination Scheme:**
Lectures: 3 Hours/Week	03	In-Semester: 30Marks End-Semester: 70 Marks

Text Books .

1."Rural Development: Principles, Policies and Management" - Katar Singh , Sage Publications.
2. "Energy conversion", R. Y. Goswami, Frank Kreith, CRC Press, 2007.
3. G. N. Tiwari, Solar Energy: Fundamentals, Design, Modeling and Applications, Narosa, 2002.

Reference Books

1. "KURUKSHETRA" - A Journal on Rural Development. 2. "Introduction to Community Development - Theory, Practice and Service Learning", Edited by J W Robinson, Sage Publications.
3. "Solar Energy: Fundamental and Application" , H. P. Garg and S. Prakash,Tata McGraw Hill, 1997.

4. “Technologies for Sustainable Rural Development: Having Potential of Socio Economic. Upliftment” , TSRD 2014 , edited by Jai Prakash Shukla, Allied Publishers Pvt. Ltd.

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit/ Assignment	Assessment Technique	Blooms Taxonomy Category
C414465A	Understand rural development model.	Unit I	Pre In Sem Test	Understanding
C414465A	Learn different measures in rural development and its impact on overall economy	Unit II ,V	Pre In Sem Test/ Pre End Sem Test	Remembering
C414465A	Understand and learn importance of technologies in rural and community development	Unit III	Pre In Sem Test	Remembering

C414465A	Understand challenges and opportunities in rural development	Unit IV,VI	Pre End Sem Test	Remembering

PREREQUISITES

Sr. No.	Unit Number	Prerequisite subject name
1.	I	Rural and community basics
2.	II	Different MEASURES AND PARADIGMS
3.	III	Different technologies for day to day problems solving
4.	IV	Problem Analysis
5.	V	Entrepreneurship and different schemes
6.	VI	Different NGO who are working for Rural Development

TEACHING PLAN

Teaching Plan Short

Academic Year:- 2020-21 Semester :- II w. e. f. :- 16/12/19

Class : - BE Division: B

Subject: - Rural Technologies and Community Development
Subject Code :- 414465A

Faculty In charge :- Vishnu Kamble No. of Lectures/ weeks: 03

- **Lecture Plan**

Sr. No.	Unit No.	Unit/ Topic Name	Start Date	End Date
1.	I	INTRODUCTION	3rd week (December)	4th week (December)
2.	II	RURAL DEVELOPMENT - MEASURES AND PARADIGMS	1st week (Jan)	2nd week (Jan)
3.	III	TECHNOLOGIES FOR RURAL DEVELOPMENT	3rd week (Jan)	4th week (Jan)
4.	IV	COMMUNITY DEVELOPMENT	1st week (Feb)	2nd week (Feb)

5.	V	COMMUNITY DEVELOPMENT - RURAL ENTREPRENEURSHIP	3rd week (Feb)	4th week (Feb)
6.	VI	CASE STUDIES AND FIELD VISIT	3rd week (March)	4th week (March)

Lect. No	Unit No.	Main Topic to be Covered	Sub Topics to be Covered	Chap. No. & Reference Books	CO to Attain	Measurable to Attain CO	Mode of delivery
1	I	INTRODUCTION	RURAL DEVELOPMENT - Concepts and connotations, Basic Elements,	Text Book 1& Reference Book 1	C414465A.1	Pre Insem Exam	PPT
2			Growth Vs. Development, Why rural development,				PPT
3			Rising expectations and development,				PPT
4			Development and Change, Human beings as cause and consequences of development.				PPT Google classroom
5			RURAL ECONOMY OF INDIA - Introduction, size and structure				PPT
6			The characteristics of rural sector, The role of agricultural sub-sector				PPT
7			The role of non-agricultural sub-sector, Challenges and opportunities.				PPT
8	II	RURAL DEVELOPMENT - MEASURES AND PARADIGMS	MEASURES OF DEVELOPMENT - Introduction	Text Book 2	C414465A.2	Pre Insem Exam	PPT
9			Measures of level of rural development, Measures of income distribution				PPT

							Google classroom
10			Measures of development simplified, Concepts and measures of rural poverty.				
11			PARADIGMS OF RURAL DEVELOPMENT - Introduction, The modernization theory, The dependency theory of Marxist School, Rosenstein				PPT Google classroom
12			Rodan's theory of 'Big Push', Lewis' model of economic development				PPT
13			The human capital model of development				PPT Google classroom
14			The Gandhian Concept of Rural Development theories from other social sciences.				PPT Google classroom
15	**III**	TECHNOLOGIES FOR RURAL DEVELOPMENT	Using Water Resources - The water cycle, Drinking Water, Water quality testing, Water filtering ,Extraction from Groundwater	Text book 1 and Reference book 4	C414465A.3		PPT
16			Pumps Rope and washer pump ,Manuel pumps				PPT

17			Treadle pump, Irrigation for agriculture			Pre Insem Exam	PPT
18			Channel systems, Sprinkler systems, Drip systems Water diversion ,Water storage				PPT
19			Building Infrastructures and Creating Energy - Basic energy uses , Energy Sources - Firewood, Solar Energy, Hydroelectricity, Hydromechanical, Wind Energy				PPT
			Energy Storage,Connecting to the Electrical Network, Environmental Considerations				PPT
20			Education, Healthcare, Agriculture, Business, Resource Mapping, Digital and Social Media Marketing Decision Support Systems for soil conservation and farm management Waste Management and Sanitation.				
21	**IV**	COMMUNITY DEVELOPMENT	DEVELOPING COMMUNITIES - Introduction, Service Learning and community development	Text book 2	C414465A.4	Pre End sem Exam	PPT
22			Theory and practice of community development				PPT
23			Community development issues				PPT
24			The diverse meaning of community development,				PPT

25			The knowledge base of community development,				PPT
26			The knowledge base of community development,				PPT
27			International community development				PPT
27	**V**	COMMUNITY DEVELOPMENT - RURAL ENTREPRENEURSHIP	Different forms of Rural Entrepreneurship, Significance , Business planning for a new venture: the concept of planning paradigm	Text book 2 & 4	C414465A.2	Pre End sem Exam	PPT
			Forms of business enterprises- Sole proprietorship				PPT
			partnership and corporations, Product and Process development, Marketing analysis				PPT
			competitive analysis, strategies; Financial resources; debt financing, banks and financial institutions				PPT
29			other non-bank financial sources; Government programmes				PPT
30			direct loan assistance and subsidies;				PPT
			Industrial and legal issues for rural enterprises				
31	**VI**	CASE STUDIES AND FIELD VISIT	Role of Micro-Finance institutions in rural development, , Watershed Management	Reference book 4	C414465A.4		PPT

32			Water-Cup Competition by Paani Foundation, Community Safe Water Solutions			Pre End sem Exam	PPT
33			Visit to a 'Woman Self help group' nearby and				PPT
34			Use of ICT in Rural development				PPT
35			study of its functioning and its role in development				PPT
			Visit to model villages in nearby region - Ralegan-Siddhi, Dist - Ahemadnagar				PPT
36			Hiware Bazar Dist - Ahemadnagar, Tikekarwadi				PPT

Unit Wise Home Assignments

UNIT I INTRODUCTION

Sr. No.	Question	CO No.	Marks	University Year
1.	Differentiate between Growth Vs. Development.	CO414465A.1	8	
2.	Explain Why rural development is necessary in today's life?		8	
3.	What are the characteristic of rural sectors?		8	
4	Explain the role of agricultural sub-sector and non-agricultural sub-sector in rural Development		5	
5	Elaborate Challenges and opportunities of rural Development?		8	

UNIT II RURAL DEVELOPMENT - MEASURES AND PARADIGMS

Sr. No.	Question	CO No.	Marks	University Year
1.	Define different Measures for the rural development.	CO414465A.2	8	
2.	How you can measure the rural poverty.		5	
3.	Elaborate modernization theory in detail with example .		8	
4	Explain dependency theory of Marxist School with example		8	
5	How you can apply the Rosenstein- Rodan's theory of 'Big Push', Lewis' model of economic development.		5	

UNIT III TECHNOLOGIES FOR RURAL DEVELOPMENT

Sr. No.	Question	CO No.	Marks	University Year
1.	What are the different Water Resources?	CO414465A.3	5	

2.	What are the different sources for the energy generation?		5	
3.	How you can use different ICT in Rural and agricultural development?		8	
4	Why Digital and Social Media Marketing Decision Support Systems important for rural development?		8	
5	How you can manage the wastage from Farm		5	

UNIT IV COMMUNITY DEVELOPMENT

Sr. No.	Question	CO No.	Marks	University Year
1.	What are the different Community development issues?	CO414465A.4	8	
2.	What are the different theories and practices for the community development,?		8	
3.	Explain the knowledge base of community development with example.		8	
4	Explain International community development with example.		5	
5	Define the meaning of Service Learning and community development.		8	

UNIT V COMMUNITY DEVELOPMENT - RURAL ENTREPRENEURSHIP

Sr. No.	Question	CO No.	Marks	University Year
1.	What are the different forms of Rural Entrepreneurship?	CO414465A.2	8	
2.	Explain any 3 Forms of business enterprises.		8	
3.	How you can raise the finance for Entrepreneurship?		8	
4	How government support the Entrepreneurship programmes ?		5	

5	Elaborate the Industrial and legal issues for rural enterprises.		5	

UNIT VI CASE STUDIES AND FIELD VISIT

Sr. No.	Question	CO No.	Marks	University Year
1.	Define the Role of Micro-Finance institutions in rural development.	CO414465A.4	8	
2.	What is the importance o of ICT in Rural development?		8	
3.	Explain the benefits of Visiting to model villages.		8	

414464 D (Elective-IV) Social Media Analytics

SYLLABUS

Savitribai Phule Pune University
Fourth Year of Information Technology (2015 Course)
414464D: Elective IV

Social Media Analytics		
Teaching Scheme: **TH:03 Hours/Week**	**Credits:03**	**Examination Scheme:** **In-Sem (Paper): 30 Marks** **End-Sem (paper): 70 Marks**

Prerequisites:

1. Basic knowledge of Graphs.
2. Data mining.
3. Data Analysis.

Course Objectives:

1. To understand foundations of Social Media Analytics.
2. To Visualize and understand the data mining aspects in social networks.
3. To solve mining problems by different algorithms.
4. To understand network measures for social data.
5. To understand behavioral part of web applications for Analysis.
6. To analyze the data available on any social media applications.

Course Outcomes:

By the end of the course, students should be able to

1. Understand the basics of Social Media Analytics.
2. Explain the significance of Data mining in Social media.
3. Demonstrate the algorithms used for text mining.
4. Apply network measures for social media data.
5. Explain Behavior Analytics techniques used for social media data.
6. Apply social media analytics for Face book and Twitter kind of applications.

UNIT I	ANALYTICS IN SOCIAL MEDIA AND TYPES OF ANALYTICS TOOLS	7 Hrs

The foundation for analytics, Social media data sources, Defining social media data, data sources in social media channels, Estimated Data sources and Factual Data Sources, Public and Private data, data gathering in social media analytics.

Unit II	VISUALIZING SOCIAL NETWORKS	7 Hrs

Introduction, A Taxonomy of Visualization, The convergence of Visualization, Interaction and Analytics. Data mining in Social Media: Introduction, Motivations for Data mining in Social Media, Data mining methods for Social Media, Related Efforts.

Unit III	TEXT MINING IN SOCIAL NETWORKS	7 Hrs

Introduction, Keyword search, Classification Algorithms, Clustering Algorithms-Greedy Clustering, Hierarchical clustering, k-means clustering, Transfer Learning in heterogeneous Networks, Sampling of online social networks, Comparison of different algorithms used for mining, tools for text mining.

Unit IV	NETWORK MEASURES	7 Hrs

Centrality: Degree Centrality , Eigenvector Centrality, Katz Centrality , PageRank, Betweenness Centrality, Closeness Centrality ,Group Centrality ,Transitivity and Reciprocity, Balance and Status, Similarity: Structural Equivalence, Regular Equivalence

Unit V	BEHAVIOR ANALYTICS	7 Hrs

Individual Behavior: Individual Behavior Analysis, Individual Behavior Modeling, Individual Behavior Prediction Collective Behavior: Collective Behavior Analysis, Collective Behavior Modeling, Collective Behavior Prediction

Unit VI	CASE STUDY	7 Hrs

Mining Twitter: Overview, Exploring Twitter's API, Analyzing 140 Characters

Mining Facebook: Overview, Exploring Facebook's Social Graph API's, Analyzing Social Graph Connections.

Text Books

1. Reza Zafarani Mohammad Ali Abbasi Huan Liu, Social Media Mining, Cambridge University Press, ISBN: 10: 1107018854.

2. Charu C. Aggarwal, Social Network Data Analytics, Springer, ISBN: 978-1-4419-8461-6.

Reference Books

1. Marshall Sponder, Social Media Analytics: Effective Tools for Building, Interpreting, and Using Metrics, McGraw Hill Education, 978-0-07-176829-0.

2. Matthew A. Russell, Mining the Social Web, O'Reilly, 2nd Edition, ISBN:10: 1449367615.

3. Jiawei Han University of Illinois at Urbana-Champaign Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 2nd Edition, ISBN: 13: 978-1-55860-901-3 ISBN: 10: 1-55860-901-6.

4. Bing Liu, Web Data Mining : Exploring Hyperlinks, Contents and Usage Data, Springer, 2nd Edition, ISBN: 978-3-642-19459-7.

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit	Assessment Technique	Blooms Taxonomy Category
C414464D.1	Understand the basics of Social Media Analytics.	I	Unit Test	Understanding
C414464D.2	Explain the significance of Data mining in Social media.	II	Unit Test	Remembering
C414464D.3	Demonstrate the algorithms used for text mining.	III	Unit Test	Analyzing
C414464D.4	Apply network measures for social media data.	IV	Unit Test	Applying
C414464D.5	Explain Behavior Analytics techniques used for social media data.	V	Unit Test	Evaluating
C414464D.6	Apply social media analytics for Face book and Twitter kind of applications.	VI	Unit Test	Applying, Creating

PREREQUISITES

Sr. No.	Unit No.	Prerequisite subject name
1.	I	NA
2.	II	Data Mining
3.	III	Data Analysis
4.	IV	Data Analysis
5.	V	Data Analysis, Basic knowledge of Graph
6.	VI	Data Analysis, Basic knowledge of Graph

TEACHING PLAN

Teaching Plan Short

TEACHING PLAN

Academic Year:-2020-21 Semester :-II w. e. f. :- 16-12-2020

Class : - BE Division:A & B

Subject :- Social Media Analytics
Subject Code :- 414464D

Faculty In charge :-Supriya Jagtap, No. of Lectures/ weeks: 3

- **Lecture Plan**

Sr. No.	Unit No.	Unit/ Topic Name	Start week	End week
1.	I	Analytics in social media and types of analytics tools	4th week of December	1 st week of January
2.	II	Visualizing social networks	2nd week of January	4th week of January
3.	III	Text mining in social networks	1st week of February	2nd week of February
4.	IV	Network measures	3rd week of February	4th week of February
5.	V	Behavior analytics	2nd week of March	3rd week of March
6.	VI	Case study	4th week of March	4th week of March

Detailed Teaching Plan

No	Unit No.	Main Topic to be Covered	Sub Topics to be Covered	Chap. No. & Reference Books	CO to Attain	Measurable to attain CO	Mode of Delivery
1.	I	Analytics in social media and types of analytics tools	The foundation for analytics	Social Media Analytics Strategy :Alex Gonçalves, Chapter 1 from the Text Book , Pg:3-20	C414464D.1	Test	PPT, Chalk & Talk
2.			Social media data sources				
3.			Defining social media data, data sources in social media channels				
4.			Estimated Data sources and Factual Data Sources				
5.			Public and Private data				
6.			Data gathering in social media analytics.				
7.			Queries & Revision				
8.	II	Visualizing social networks	Introduction, A Taxonomy of Visualization,	Charu C. Aggarwal, Social Network Data Analytics, Chapter 11	C414464D.2	Test	PPT, Video Chalk & Talk
9.			The convergence of Visualization,				
10.			Interaction and Analytics.				
11.			Data mining in Social Media: Introduction,				

12.			Motivations for Data mining in Social Media,			
13.			Data mining methods for Social Media,			
14.			Related Efforts.			
15.			Queries & Revision			
16.	**III**	Text mining in social networks	Introduction, Keyword search	Charu C. Aggarwal, Social Network Data Analytics, Chapter: 13 from the Text Book	C414464D.3	Test	PPT, Video Chalk & Talk
17.			Classification Algorithms,				
18.			Clustering Algorithms-				
19.			Greedy Clustering, Hierarchical clustering				
20.			k-means clustering				
21.			Transfer Learning in heterogeneous Networks				PPT, Video Chalk & Talk
22.			Sampling of online social networks				
23.			Comparison of different algorithms used for mining				
24.			Tools for text mining.				
25.	**Assessment**						

26.	IV	Network measures	Centrality: Degree Centrality	Reza Zafarani - Social Media Mining, Chapter 3: From the Text book Pg no: 73-98	C414464D.4	Test	PPT, Video Chalk & Talk
27.			Eigenvector Centrality,				
28.			Katz Centrality , PageRank				
29.			Betweenness Centrality,				
30.			Closeness Centrality ,Group Centrality, Transitivity and Reciprocity				
31.			Balance and Status, similarity: Structural Equivalence,				
32.			Regular Equivalence				
33.	V	Behavior analytics	Individual Behavior Analysis,	Reza Zafarani - Social Media Mining, Pg 319-343 from text book	C414464D.5	Test	PPT, Video Chalk & Talk
34.			Individual Behavior Modeling,				
35.			Individual Behavior Prediction				
36.			Collective Behavior Analysis,				
37.			Collective Behavior Modeling,				
38.			Collective Behavior Prediction				
39.			Discussion				
40.	VI	Case study	Mining Twitter: Overview		C414464D.6	Test	PPT, Video

41.			Exploring Twitter's API,	Matthew A. Russell, Mining the Social Web, O'Reilly, 2nd Edition Chapter 1 & 2: Page: 5-85			Chalk & Talk
42.			Analyzing 140 Characters				
43.			Mining Facebook: Overview,				
44.			Exploring Facebook's Social Graph API's,				
45.			Analyzing Social Graph Connections				
46.	**Assessment**						

1. Text Books

1. Alex Goncalves, Social Media Analytics Starategy: Using Data to Optimize Business Performance, Apress, eBook ISBN:978-1-4842-3102-9
2. Reza Zafarani, Mohammad Ali Abbasi, Huan Liu, Social Media Mining, Cambridge University Press, ISBN: 10: 1107018854.
3. Charu C. Aggarwal, Social Network Data Analytics, Springer, ISBN: 978-1-4419-8461-6.of Data, Cambridge University Press, Edition 2012.

2. Reference Books

1. Marshall Sponder, Social Media Analytics: Effective Tools for Building, Interpreting, and Using Metrics, McGraw Hill Education, 978-0-07-176829-0.
2. Matthew A. Russell, Mining the Social Web, O'Reilly, 2nd Edition, ISBN:10: 1449367615.
3. Jiawei Han University of Illinois at Urbana-Champaign Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 2nd Edition, ISBN: 13: 978-1-55860-901-3 ISBN: 10: 1-55860-901-6.
4. Bing Liu, Web Data Mining : Exploring Hyperlinks, Contents & Usage Data, Springer, 2nd Edition, ISBN: 978-3-642-19459-7

UNIT WISE QUESTION BANK

Sr. No.	Questions	CO No	Marks	University Year
UNIT 1 : ANALYTICS IN SOCIAL MEDIA AND TYPES OF ANALYTICS TOOLS				
1.	What are the social media success tracking tools?	C414454.1	5	Blog
2.	Discuss the Importance of Social Media	C414454.1	4	Blog
3.	In what ways can you measure social return on investment (ROI)?	C414454.1	4	Blog
4.	What are the Social Media Analytics tools that can help you track your social presence?	C414454.1	5	Web
5.	How can organizations successfully navigate the social media monitoring market when it's so fragmented and features so many point solutions?	C414454.1	5	Web
6.	How to collect Social Media Data?	C414454.1	5	Online
7.	Define Social Media Data? Explain Data sources in social media channels.	C414454.1	5	Mar 2019
8.	Compare Estimated and Factual Data Sources.	C414454.1	5	Mar 2019
9.	Explain different ways to gather data in social media analytics.	C414454.1	5	Mar 2019
10.	Explain Public and Private data in social Media.	C414454.1	5	Mar 2019
UNIT II : VISUALIZING SOCIAL NETWORKS				
1.	Explain Structural Visualization with approaches?	C414454.1	6	Mar 2019
2.	Explain convergence of Visualization and Analysis?	C414454.1	6	Mar 2019
3.	What is Visualization? State its importance in social media.	C414454.1	5	Mar 2019
4.	Explain convergence of Visualization and Interaction?	C414454.1	6	Mar 2019
5.	Write a short note on Ontology based Visualization.	C414454.1	5	May 2017

UNIT III : TEXT MINING IN SOCIAL NETWORKS				
1.	Explain k means clustering algorithm with example.	C414454.2	4	Mar 2019
2.	Brief about keyword search. What are the challenges in this regards.	C414454.2	6	Mar 2019
3.	Discuss keyword searches over XML and Relational data.	C414454.2	4	Mar 2019
4.	Write short note on Transfer Learning in heterogeneous Networks.	C414454.2	5	Mar 2019
5.	Write short note on: Keyword search Classification Clustering Linkage based cross domain learning	C414454.2	5	Book
6.	List the different classification algorithms	C414454.2	5	Book
7.	Write a note on text mining in Social networks	C414454.2	5	May 2019
8.	Write a note on Object Rank algorithm.	C414454.2	8	Book
UNIT IV : NETWORK MEASURES				
1.	What is Centrality? Explain Degree Centrality and Katz Centrality with examples.	C414454.2	8	May 2019
2.	Explain Transitivity and Reciprocity with equations.	C414454.2	8	May 2019
3.	How Similarity between two nodes can be computed using Structural Equivalence?	C414454.2	8	May 2019
4.	Explain Balance and Status theory using proper examples.	C414454.2	8	May 2019
5.	Explain Reciprocity.	C414454.2	9	May 2019

6.	What is the role of Clustering Coefficient	C414454.2	9	May 2019
7.	What is meant by Group Centrality?	C414454.2	5	Book
UNIT V : BEHAVIOR ANALYTICS				
1.	Write a note on Behavior analysis methodology.	C414454.3	8	May 2019
2.	Explain Collective Behavior Prediction using sample example.	C414454.3	8	May 2019
3.	What are the Node Neighborhood-Based methods?	C414454.3	8	May 2019
4.	Explain how User Migration can be used in Collective Behavior Analysis.	C414454.3	8	May 2019
5.	Consider the “commenting under a blogpost” behavior in social media. Follow the four steps of behavior analysis to analyze this behavior.	C414454.3	4	Book
6.	Name five real-world behaviors that are commonly dicult to observe in social media (e.g., your daily schedule or where you eat lunch are rarely available in social media).	C414454.3	5	Book
7.	Select one behavior that is most likely to leave traces online. Can you think of a methodology for identifying that behavior using these traces?	C414454.3	8	Book
8.	Recent research has shown that social media can help replicate survey results for elections and ultimately predict presidential election outcomes. Discuss what possible features can help predict a presidential election.	C414454.3	5	Book
9.	Provide the matrix format for rooted PageRank and SimRank techniques.	C414454.3	5	Book
10.	We emphasized selecting meaningful features for analyzing a behavior. Discuss a methodology to verify if the selected features carry enough	C414454.3	5	Book

	information with respect to the behavior being analyzed.			
11.	Correlation does not imply causality. Discuss how this fact relates to most of the datasets discussed in this chapter being temporal.	C414454.3	4	Book
UNIT VI : CASE STUDY				
1.	List out the tips to improve your Facebook EdgeRank?	C414454.3	8	Online
2.	What is Facebook EdgeRank? Why does it matters?	C414454.3	8	Online
3.	What are the best practices on Twitter?	C414454.3	8	Online
4.	How can you boost Facebook reach?	C414454.3	8	Online
5.	How would you define Twitter?Explain with different services.	C414454.3	8	May 2019
6.	Explore Facebook's Social Graph API.	C414454.3	8	May 2019
7.	Write a note on Mining Twitter	C414454.3	9	May 2019
8.	Explain Facebook with analyzing social graph conections.	C414454.3	9	May 2019
9.	Analyze your own friendships and try to determine if your own network has any natural rallying points or common interests. What is the common glue that binds your network together?	C414454.3	8	Book
10.	The number of Facebook objects available to the Graph API is enormous. Can you examine objects such as photos or checkins to discover insights about anyone in your network? For example, who posts the most pictures, and can you tell what are they about based on the comments stream? Where do your friends check in most often?	C414454.3	8	Book

Additional Resources

1. https://www.analyticsvidhya.com/
2. https://www.springboard.com/
3. https://www.edureka.co/
4. https://www.talkwalker.com/social-media-analytics
5. https://www.techopedia.com/definition/13853/social-media-analytics-sma

414464A Internet of Things Laboratory

Teaching Scheme:	Credits:04	Examination Scheme:
Practical:02 Hours/Week		TW:25 Marks OR: 25 Marks

Prerequisites:

1. Computer Network Technology
2. Processor Architecture and Interfacing.

Course Objectives :

1. To study IoT platforms such as Raspberry-Pi/Beagle board/Arduino.
2. To study operating systems for platforms such as Raspberry-Pi/Beagle board/Arduino.
3. To get knowledge for communicating with objects.
4. To explore cloud environment for IoT.
5. To provide knowledge for IoT related protocols such as MQTT / CoAP etc.
6. To design the web interface for IoT.

Guidelines for Instructor's Manual

1. The faculty member should choose a suitable IoT platform from Raspberry-Pi, Beagle board, Arduino for study and implementation.
2. The faculty member should prepare the laboratory manual for all the experiments and it should be made available to students and laboratory instructor/Assistant

Guidelines for Student's Lab Journal

1. Student should submit term work in the form of handwritten journal based on specified list of assignments.
2. Practical Examination will be based on the term work.
3. Candidate is expected to know the theory involved in the experiment.

4. The practical examination should be conducted if and only if the journal of the candidate is complete in all respects.

Guidelines for Lab /TW Assessment

1. Examiners will assess the term work based on performance of students considering the parameters such as timely conduction of practical assignment, methodology adopted for implementation of practical assignment, timely submission of assignment in the form of handwritten write-up along with results of implemented assignment, attendance etc.

2. Examiners will judge the understanding of the practical performed in the examination by asking some questions related to theory & implementation of experiments he/she has carried out.

3. Appropriate knowledge of usage of software and hardware related to respective laboratory should be checked by the concerned faculty member. As a conscious effort and little contribution towards Green IT and environment awareness, attaching printed papers of the program in journal may be avoided. There must be hand-written write-ups for every assignment in the journal. The DVD/CD containing students programs should be attached to the journal by every student and same to be maintained by department/lab In-charge is highly encouraged. For reference one or two journals may be maintained with program prints at Laboratory.

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SUGGESTED LIST OF LABORATORY ASSIGNMENTS

Assignment No.1:

Study of Raspberry-Pi, Beagle board, Arduino.

Assignment No.2:

Study of different operating systems for Raspberry-Pi/Beagle board/Arduino. Understanding the process of OS installation on Raspberry-Pi/Beagle board/Arduino

Assignment No.3:

Open source prototype platform- Raspberry-Pi/Beagle board/Arduino -Simple program digital read/write using LED and Switch -Analog read/write using sensor and actuators

Assignment No.4:

Upload data from environmental sensor to cloud server (You can use any public cloud IBM Watson IoT cloud or Google or AWS etc.)

Assignment No.5:

Introduction to MQTT/ CoAP and sending sensor data to cloud using Raspberry-Pi/Beagle board/Arduino.

Assignment No.6:

Design a web interface to control connected LEDs remotely using Raspberry-Pi/Beagle board/Arduino.

Assignment No.7:

Install, configure XMPP server and deployed an application on Raspberry Pi/Beagle board/Arduino.

Write client applications to get services from the server application

Assignment No.8:

Install, configure APACHE server and deployed an application on Raspberry Pi/Beagle board/Arduino. Write client applications to get services from the server application

References

1. The Internet of Things Key applications and protocols Olivier Hersent Willy Publications 2nd Edition 978-1-119- 99435-0,

2.The Internet of Things Connecting Objects to the Web Hakima Chaouchi, Willy Publications 978-1-84821- 140-7

3.The Internet of Things Donald Norris TAB 4 Smart Internet of Things Projects Agus Kurniawan PACKT

4.Getting Started with the Internet of Things Cuno Pfister SPD O'REILL Y IOT

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Assignment	Assessment Technique	Blooms Taxonomy Category
CO414464A.1	To understand IoT platforms such as Raspberry-Pi/Beagle board/Arduino.	1	CONTINOUS ASSESSMENT & MOCK TEST	Understand
CO414464A.2	To understand operating systems for platforms such as Raspberry-pi/Beagle board/Arduino.	2		Understand
CO414464A.3	To show commination with objects using IoT platforms such as Raspberry-pi/Beagle board/Arduino.	3		Understand
CO414464A.4	Make use of interface cloud environment for IoT application.	4		Apply
CO414464A.5	5	5		Apply
CO414464A.6	To build the web interface for IoT.	6,7,8		Apply

PREREQUISITES

Sr No	Title of assignment	Prerequisites
1	Study of Raspberry-Pi, Beagle board, Arduino.	Processor Architecture and Interfacing
2	Study of different operating systems for Raspberry-Pi/Beagle board/Arduino. Understanding the process of OS installation on Raspberry-Pi/Beagle board/Arduino	Processor Architecture and Interfacing
3	Open source prototype platform-Raspberry-Pi/Beagle board/Arduino - Simple program digital read/write using LED and Switch -Analog read/write using sensor and actuators	Processor Architecture and Interfacing
4	Upload data from environmental sensor to cloud server (You can use any public cloud IBM Watson IoT cloud or Google or AWS etc.)	Computer Network Technology
5	Introduction to MQTT/ CoAP and sending sensor data to cloud using Raspberry-Pi/Beagle board/Arduino.	Computer Network Technology
6	Design a web interface to control connected LEDs remotely using Raspberry-Pi/Beagle board/Arduino.	Computer Network Technology
7	Install, configure XMPP server and deployed an application on Raspberry Pi/Beagle board/Arduino. Write client applications to get services from the server application	Computer Network Technology
8	Install, configure APACHE server and deployed an application on Raspberry Pi/Beagle board/Arduino. Write client applications to get services from the server application	Computer Network Technology

TEACHING PLAN SHORT		
Academic Year:- 2019-12	Semester :- II	w. e. f. :-21/01/2021
Class : -BE		Division:A/B
Subject :- Internet of Things Laboratory		Subject Code :- 414464A
Faculty In charge :- Mrs. Sampada Aditya Kulkarni		No. of Practical/ weeks: 1

Practical Plan

Sr. No.	Assignment No.	Assignment Name	Start week	End week
1.	1	Study of Raspberry-Pi, Beagle board, Arduino.	3rd Week Jan	3rd Week Jan
2.	2	Study of different operating systems for Raspberry-Pi/Beagle board/Arduino. Understanding the process of OS installation on Raspberry-Pi/Beagle board/Arduino	4th Week Jan	4th Week Jan
3.	3	Open source prototype platform- Raspberry-Pi/Beagle board/Arduino -Simple program digital read/write using LED and Switch - Analog read/write using sensor and actuators	1st Week Feb	1st Week Feb
4.	4	Upload data from environmental sensor to cloud server (You can use any public cloud IBM Watson IoT cloud or Google or AWS etc.)	2nd week Feb	3rd Week Feb
5.	5	Introduction to MQTT/ CoAP and sending sensor data to cloud using Raspberry-Pi/Beagle board/Arduino.	4th Week Feb	1st Week March
6.	6	Design a web interface to control connected LEDs remotely using Raspberry-Pi/Beagle board/Arduino.	2nd week March	4th Week March
7	7	Install, configure XMPP server and deployed an application on Raspberry Pi/Beagle board/Arduino. Write client applications to get services from the server application	1st Week April	2nd week April
8	8	Install, configure APACHE server and deployed an application on Raspberry Pi/Beagle board/Arduino. Write client applications to get services from the server application	3rd week April	4th week April

PRACTICAL PRACTICE QUESTIONS

Assignment No.1: Study of Raspberry-Pi, Beagle board, Arduino.
Assignment No.2: Study of different operating systems for Raspberry-Pi/Beagle board/Arduino. Understanding the process of OS installation on Raspberry-Pi/Beagle board/Arduino
Assignment No.3: Open source prototype platform- Raspberry-Pi/Beagle board/Arduino -Simple program digital read/write using LED and Switch -Analog read/write using sensor and actuators
Assignment No.4: Upload data from environmental sensor to cloud server (You can use any public cloud IBM Watson IoT cloud or Google or AWS etc.)
Assignment No.5: Introduction to MQTT/ CoAP and sending sensor data to cloud using Raspberry-Pi/Beagle board/Arduino.
Assignment No.6: Design a web interface to control connected LEDs remotely using Raspberry-Pi/Beagle board/Arduino.
Assignment No.7: Install, configure XMPP server and deployed an application on Raspberry Pi/Beagle board/Arduino. Write client applications to get services from the server application
Assignment No.8: Install, configure APACHE server and deployed an application on Raspberry Pi/Beagle board/Arduino. Write client applications to get services from the server application

ORAL QUESTION BANK

1. What Is the Internet of Things (IoT)
2. How Does the IoT Work?
3. What Impacts Will the IoT Have
4. What Is the Current Federal Role?
5. What Issues Might Affect the Development and Implementation of the IoT?
6. What Actions Has Congress Taken
7. Where Can I Find Additional Resources on This Topic?"
8. What are key technologies for Internet of Things
9. What types of things get connected in IoT
10. Explain the IoT Architecture with neat diagram
11. Write in detail application of internet of Things
12. What is IoT. List application of IoT
13. What are the different things connected to IoT
14. Write short note on : Overview and motivation for Internet of Things
15. What types of things get connected in IoT
16. Discuss area development and standardization in Internet of Things
17. Discuss any two example of Internet of Things
18. Explain in detail History and overview of IoT
19. Explain HLSA IoT Framework
20. Installation with preconfigured SD-card image
21. What is a Raspberry Pi?
22. What are the different models of Raspberry Pi available?
23. What are the physical dimensions of the Raspberry Pi?
24. What is the SoC used for the Raspberry Pi?
25. How powerful is the Raspberry Pi?
26. Will the Raspberry Pi blend?
27. Is it possible to overclock the Raspberry Pi?
28. How do you boot the Raspberry Pi?
29. What are the power requirements of the Raspberry Pi?
30. Does Raspberry Pi need external hardware?
31. What do we use to connect TV to RPi?
32. What is the Ethernet/LAN cable used in RPi?
33. What are the parameters that are default values?

34. What are the distributions are supported by raspberry Pi?
35. What bit processor is used in Pi 3?
36. What is the speed of operation in Pi 3?
37. Do you know any port of Pi4j for PCDuino boards or anything similar? I am particularly interested in I2C, oneWire and Serial reading.
38. What is Arduino?
39. What do you mean by open-source hardware?
40. How can I get an Arduino board?
41. Which are the official Arduino boards?
42. Do you have a Privacy Policy about my data as registered user?
43. I tried to login with my email and it didn't work, what should I do?
44. I tried to login with my username and it didn't work.
45. But it worked until a few days ago…
46. But it still works on some sites…
47. I have real trouble logging in or signing up, what should I do?
48. Compare Cloud and On-premise Computing?
49. What is Cloud Computing?
50. What are the benefits of cloud computing?
51. Mention the Layers of PaaS Architecture.
52. Mention the Layers of PaaS Architecture.
53. What are the components of Windows Azure?
54. What are the differences occurred in Distributed operations?
55. Which agent is equivalent of Nova Compute?
56. Mention the Reliability and Availability of Cloud Computing.
57. Explain the Common storage of PaaS Architecture.
58. Explain the security usage in Amazon Web Services model.
59. What is an AMI? How do we implement it?
60. What are reasons that made Amazon so big?
61. What are the advantages of using cloud computing?
62. Mention platforms which are used for large scale cloud computing?
63. What is the difference in cloud computing and computing for mobiles?

64. List out different layers which define cloud architecture?
65. What are system integrators in Cloud Computing?
66. Explain WAMP stack serever stack in detail
67. What can I do with Autobahn
68. Short note on WebSocket Echo (Twisted-based)
69. Short note on WebSocket Echo (Asyncio-based)
70. What is Python? Can you enlist the benefits of using Python?
71. How to connect IoT device to cloud
72. Explain different cloud services?
73. AWS connection steps.
74. Explain MQTT use in IOT

ADDITIONAL RESSOURCES

http://mqtt.org/

https://dzone.com/articles/coap-protocol-step-by-step-guide

https://aws.amazon.com/iot/

https://cloud.google.com/solutions/iot/

https://www.elprocus.com/building-the-internet-of-things-using-raspberry-pi/

414457C
(Elective II)
CL-IX

SYLLABUS

Teaching Scheme: Credits: 02 Examination Scheme:

Practical: 04 Hours/Week TW: 50 Marks

Prerequisites:

1. Operating Systems

2. Computer Network Technology

414466: COMPUTER LABORATORY-IX

3. Web Technology

Course Objectives:

1. The course aims to provide an understanding of the principles on which the distributed systems are based; their architecture, algorithms and how they meet the demands of Distributed applications.
2. The course covers the building blocks for a study related to the design and the implementation of distributed systems and applications.

Course Outcomes:

Upon successful completion of this course student will be able to:

1. Demonstrate knowledge of the core concepts and techniques in distributed systems.
2. Learn how to apply principles of state-of-the-Art Distributed systems in practical application.
3. Design, build and test application programs on distributed systems.

Guidelines:

This Computer Laboratory-IX course has Distributed Systems as a core subject. The problem statements should be framed based on first six assignments mentioned in the syllabus. The teachers will frame the problem statements with due consideration that students have three hours to complete that. The practical examination will comprise of implementation and related theory. All assignments to be performed in Java 9.

Assignment List:

Assignment:	**1**
To develop any distributed application through implementing client-server communication programs based on Java Sockets and RMI techniques.	
Assignment:	**2**

To develop any distributed application using Message Passing Interface (MPI)	
Assignment:	**3**
To develop any distributed application with CORBA program using JAVA IDL.	
Assignment:	**4**
To develop any distributed algorithm for leader election.	
Assignment:	**5**
To create a simple web service and write any distributed application to consume the web service.	
Assignment:	**6**
To develop any distributed application using Messaging System in Publish-Subscribe paradigm.	
Assignment:	**7**
To develop Microservices framework based distributed application.	

Term work:

Staff in-charge will suitably frame the above assignments and flexibility may be incorporated. Students will submit term work in the form of journal. Each assignment has to be well documented with problem definition, code documented with comments. Staff in-charge will assess the assignments continuously and grade or mark each assignment on completion date. All the assignments should be conducted on Latest version of Open Source Operating Systems, tools and Multi-core CPU supporting Virtualization and Multi-Threading.

Reference books:

1. George Coulouris, Jean Dollimore, Tim Kindberg & Gordon Blair,Distributed Systems – Concept and Design,Pearson,5th Edition ,ISBN:978-13-214301-1
2. Nancy Ann Lynch, Distributed Algorithms, Morgan Kaufmann Publishers, illustrated, reprint,ISBN:9781558603486

CO No.	Course Outcome	Mapping With Unit/ Assignment	Assessment Technique	Blooms Taxonomy Category
C414466.1	To develop a distributed application through the concept of client-server communication.	1,2,4	Continuous Assessment and Mock Practical Exam	Creating
C414466.2	To apply principles of state-of-the-art distributed systems in practical applications.	3,5,6,7		Applying
C414466.3	To build an application programs on distributed systems.	5,6,7		Creating

COURSE OUTCOMES

TEACHING PLAN

Teaching Plan Short

Academic Year: - 2020-21 Semester:-II w. e. f.:- 16th of Dec 2020

Class: - BE Division: A/B

Subject: - COL-IX Subject Code: - 414466

Faculty In charge: - Mrs. Swapna Bhavsar & Mr.Deepak Tamhane

No. of Lectures/ weeks: 3

- **Practical Plan**

Sr. No.	Assignment No.	Assignment Name	Start week	End week
1.	I	To develop any distributed application through implementing client-server communication programs based on Java Sockets and RMI techniques.	Dec week 3	Dec week 4
2.	II	To develop any distributed application using Message Passing Interface (MPI)	Jan week 1	Jan week 2
3.	III	To develop any distributed application with CORBA program using JAVA IDL.	Jan week 3	Jan week 4
4.	IV	To develop any distributed algorithm for leader election.	Jan week 5	Feb week 2

5.	V	To create a simple web service and write any distributed application to consume the web service.	Feb week 2	Feb week 4
6.	VI	To develop any distributed application using Messaging System in Publish-Subscribe paradigm.	Mar week 1	Mar week 2
7.	VII	To develop Microservices framework based distributed application.	Mar week 3	Mar week 4

PRACTICAL PRACTICE QUESTIONS

1. Design a distributed application which consists of a server and client using thread.

2. Design a distributed application using RMI for remote computation where client submits two strings to the server and server returns the concatenation of the given strings.
3. Design a distributed application using RMI for remote computation where client submits string to the server and server will check whether a string is palindrome or not and returns result to client.
4. Design a distributed application using RMI for remote computation where client submits two integers to the server and server will perform arithmetic operations and returns result to client.

5. Design a distributed application using RPC for remote computation where client submits an integer value to the server and server calculates factorial and returns the result to the client program.

6. Design a distributed application using RPC for remote computation where client submits an integer value to the server and server will check whether a value is prime or not and returns the result to the client program.

7. Design a distributed application using RPC for remote computation where client submits an integer value to the server and server will check whether a value is odd or even and returns the result to the client program.
8. Design a distributed application using Message Passing Interface (MPI) for remote computation where client submits a string to the server and server returns the reverse of it to the client. (In C Language).
9. Design a distributed application using Message Passing Interface (MPI) for remote computation where client submits two strings to the server and server returns concatenation of it to the client.
10. To create a simple web service and write any distributed application to consume the web service based on SOAP.
11. To create a simple web service and write any distributed application to consume the web service based on REST.

ORAL QUESTION BANK

1. What is DS?
2. Differentiate DS with multiprocessor systems?
3. Differentiate DS with multicomputer systems?
4. Differentiate multicomputer with multiprocessor systems?
5. Differentiate loosely coupled systems with tightly coupled systems.
6. What is NOS?
7. What r different challenges for DS?
8. What is Socket Programming?
9. What is Socket (), Bind (), Listen (), Accept () And Connect ()?
10. What is middleware?
11. In which layer middleware is preset OSI model?
12. What r proxy caches & client caches?
13. Where these r (proxy &client) available on windows system practically?
14. Give different examples of middleware.
15. Give different examples of DS.
16. Explain persistence & synchronity in communication?

17. Give example of transient, persistence communication
18. What is MPI?
19. Where MPI is available practically?
20. Differentiate between stream & message oriented communication with examples.
21. What is RPC?
22. Give practical example of RPC?
23. Do you know where whether RPC is available on widows?
24. Explain RPC in detail.
25. What is difference between passing parameter by value & by reference in RPC?
26. How interface is used in RPC
27. What is IDL?
28. How IDL is compiled?
29. What is compiler used for IDL?
30. Why IDL needs to be used?
31. What is NFS?
32. Where do you use NFS?
33. Whether NFS is implemented on windows?
34. Where NFS is used?
35. What is automounting?
36. How is NFS used on linux practically?
37. Explain file locking in NFS?
38. What is file locking?
39. What r measures taken for file locking?
40. What is naming?
41. What is object adapter?
42. What is need of object adapter?
43. What is client stub & server stub?
44. What are the files associated with these stubs in RPC & RMI?
45. What is difference between static & dynamic invocation?
46. What is difference between persistent & transient object?
47. Differentiate between RPC & RMI?
48. What is RMIC?
49. What is specification file .X?
50. What is RPCGEN?

51. What is Naming.lookup?
52. What is Naming.bind?
53. What is reference counting?
54. What is DNS?
55. I want to resolve the name www.yahoo.com , how would I do it using DNS?
56. Explain network in our college? (gateway , routers, private IPs used in our college)
57. Is there DNS server available in our college what is synchroization?
58. If one has to implement the synchronization in distributed appication how w'd he do it? For Example I have distributed database in Bank?
59. What do you understand by the term "MapReduce"?
60. Explain Hadoop in short.
61. What are the facilities provided by Hadoop?
62. Draw and explain the Hadoop architecture in brief.
63. What is stock exchange data?
64. What is Hadoop Common?
65. What is Hadoop YARN?
66. What is Hadoop Distributed File System?
67. What is CORBA?
68. How CORBA is implemented?
69. What is object adapter used in CORBA?
70. What is the difference between RMI & CORBA?
71. CORBA uses few languages whose IDL definitions are ready which are they ?
72. If I add new language to CORBA will it work?
73. CORBA uses concept of object adapter, what this concept is ?
74. Do you know OMG 's implementation of CORBA?
75. What is RFC?
76. How a printer service is implemented in DS?
77. What are the contents of object reference?
78. What r the contents of object pointers in CORBA?
79. What is a microservice?
80. Explain Time and Global states?
81. What is Election algorithm. Suppose that two processes detect the demise of coordinator simultaneously and both decide to hold an election using bully algorithm. what happens??

82. Explain Clock Event and process states.
83. What is synchronization physical clock?
84. Explain Logical Time and logical clock.
85. Explain global state with example.
86. Explain distributed mutual exclusion.
87. What is EJB? Explain the important roles involved within EJB.
88. State and explain different types of data structures with respect to UDDI.
89. What is XML Security?
90. List and explain various issues involved in object oriented middleware.

ADDITIONAL RESOURCES

https://nptel.ac.in/courses/106106107/

1. https://onlinecourses.nptel.ac.in/noc17_cs42/preview
2. http://web.cs.wpi.edu/~cs4513/c16/
3. Practical Assignments: https://www.youtube.com/watch?v=IKsHhaI1mdg

414467: Computer Laboratory-X

SYLLABUS

414467: COMPUTER LABORATORY-X

Teaching Scheme:
Practical:02 Hours/Week

Credits:01

Examination Scheme:

TW:25 Marks

OR: 25 Marks

Prerequisites:

1. Computer Network Technology.
2. Human Computer Interface

Course Objectives:

1. To design and implement user interfaces for performing database operations.
2. To design applications for accessing smart devices and data generated through sensors and services.
3. To implement authentication protocols for providing security.

Course Outcomes:

1. To set up the Android environment and explain the Evolution of cellular networks.
2. To develop the User Interfaces using pre-built Android UI components.
3. To create applications for performing CURD SQLite database operations using Android.
4. To create the smart android applications using the data captured through sensors.
5. To implement the authentication protocols between two mobile devices for providing. Security.
6. To analyze the data collected through android sensors using any machine learning algorithm.

Suggested List of Laboratory Assignments

I. Android development environment. Installing and setting up the environment. Hello world application. Running the emulator. Inserting debug messages.

II. Android UI Design: Design a User Interface using pre-built UI components such as structured layout objects, UI controls and special interfaces such as dialogs, notifications, and menus. Also make this UI attractive using Android graphics platform OpenGL

III. Android-database Connectivity: Create a SQLite Database for an Android Application and perform CRUD (Create, Read, Update and Delete) database operations.

IV. Sensors for building Smart Applications: Use any sensors on the device to add rich location and motion capabilities to your app, from GPS or network location to accelerometer, gyroscope, temperature, barometer, and more.

V. Develop a Smart Light System (Light that automatically switched on in evening and gets off in morning) using open source Hardware platform like Arduino and some sensors

(Light dependent resistor) and actuator (An LED).

VI. Design and Develop a GUI for FAN regulator that uses Android platform

VII. Develop an Android based FAN regulator using open source Hardware platform like NodeMcu and actuator (a SERVO Motor).

VIII. Android and Machine Learning: Mobile multimodal sensing- Draw inferences over the data coming from phone's sensing hardware (e.g. accelerometer, GPS, microphone), and processing these samples with the help of machine learning. (Any Application: Healthcare, Smart City, Agriculture, etc.).

IX. Android API: Implement an application that uses Android APIs like Google Map, recording and playing audio and video, using the built-in camera as an input device.

X. Wireless Network: Develop an app for a rolling display program of news on computer display. The input strings are supplied by the mobile phone/ by another computer connected through wireless networks.

XI. Android Security: Authentication of two mobile devices.

XII. Case Study: Evolution of cellular networks all the way up to 7G

COURSE OUTCOMES

CO No.	Course Outcome	Mapping With Unit/ Assignment	Assessment Technique	Blooms Taxonomy Category
C414467 .I	Set up the Android environment and explain the Evolution of cellular networks.	Assignment 1, Assignment 12	Continuous Assessment and Mock Practical Examination.	II. Understanding
C414467 .II	Develop the User Interfaces using pre-built Android UI components.	Assignment 2, Assignment 6, Assignment 7, Assignment 9		VI. Creating
C414467 .III	Create applications for performing CURD SQLite database operations using Android.	Assignment 3		VI. Creating
C414467.IV	Create the smart android applications using the data captured through sensors.	Assignment 4, Assignment 5, Assignment 10		VI. Creating
C414467.V	Implement the authentication protocols between two mobile devices for providing. Security.	Assignment 11		III. Applying
C414467.VI	Analyze the data collected through android sensors using any machine learning algorithm.	Assignment 8		IV. Analyzing

PREREQUISITES

Sr. No.	Assignment No	Assignment Title	Pre-requisites
1.	I	Android development environment. Installing and setting up the environment. Hello world application. Running the emulator. Inserting debug messages.	Computer Network Technology.
2.	II	Android UI Design: Design a User Interface using pre-built UI components such as structured layout objects, UI controls and special interfaces such as dialogs, notifications, and menus. Also make this UI attractive using Android graphics platform OpenGL.	Human Computer Interface.
3.	III	Android-database Connectivity: Create a SQLite Database for an Android Application and perform CRUD (Create, Read, Update and Delete) database operations.	Database and SQL.
4.	IV	Sensors for building Smart Applications: Use any sensors on the device to add rich location and motion capabilities to your app, from GPS or network location to accelerometer, gyroscope, temperature, barometer, and more.	Computer Network Technology.
5.	V	Develop a Smart Light System (Light that automatically switched on in evening and gets off in morning) using open source Hardware platform like Arduino and some sensors (Light dependent resistor) and actuator (An LED).	Computer Network Technology.
6.	VI	Design and Develop a GUI for FAN regulator that uses Android platform.	Human Computer Interface.
7.	VII	Develop an Android based FAN regulator using open source Hardware platform like NodeMcu and actuator (a SERVO Motor).	Computer Network Technology.
8.	VIII	Android and Machine Learning: Mobile multimodal sensing- Draw inferences over the data coming from phone's sensing hardware (e.g. accelerometer, GPS, microphone), and processing these samples with the help of machine learning. (Any Application: Healthcare, Smart City, Agriculture, etc.)	Computer Network Technology.
9.	IX	Android API: Implement an application that uses Android APIs like Google Map, recording and playing audio and video, using the built-in camera as an input device.	Computer Network Technology.
10.	X	Wireless Network: Develop an app for a rolling display program of news on computer display. The input strings are supplied by the mobile phone/ by another computer connected through wireless networks.	Computer Network Technology.
11.	XI	Android Security: Authentication of two mobile devices.	Computer Network Technology.
12.	XII	Case Study: Evolution of cellular networks all the way up to 7G.	Computer Network Technology.

TEACHING PLAN

Academic Year:-2019-2020 Semester :- II w. e. f. :-16-12-2019

Class : - BE Division: A, B

Subject :- Computer Laboratory X Subject Code :- 414467

Faculty In charge :- Mrs. Suhasini L. Bhat, Mrs. Ketki Gawali No. of Practical/ week: 2 hrs

- **Practical Plan**

Sr. No.	Assignment No	Assignment Title	Start Date	End Date
1.	I	Android development environment.	Dec. 3rd week	Dec.4th week
2.	II	Android UI Design.	Dec. 3rd week	Dec.4th week
3.	III	Android-database Connectivity.	Dec. last week	Jan. 2nd week
4.	IV	Sensors for building Smart Applications.	Dec. last week	Jan. 2nd week
5.	V	Develop a Smart Light System using open source Hardware platform like Arduino and some sensors and actuator.	Jan. 3rd week	Jan 4th week
6.	VI	Design and Develop a GUI for FAN regulator that uses Android platform.	Jan. 3rd week	Jan 4th week
7.	VII	Develop an Android based FAN regulator using open source Hardware platform like NodeMcu and actuator (a SERVO Motor).	Jan. 3rd week	Jan 4th week
8.	VIII	Android and Machine Learning.	Jan. last week	Feb 2nd week
9.	IX	Android API	Feb 3rd week	Feb 4th week
10.	X	Wireless Network.	Feb. last week	Mar. 3rd week

11.	XI	Android Security: Authentication of two mobile devices.	March 4th week	April 1st week
12.	XII	Case Study: Evolution of cellular networks all the way up to 7G.	March 4th week	April 1st week

PRACTICAL PRACTICE QUESTIONS

1. Design User Interface for Hospital Management System and run your app on device.
2. Build an android application which stores basic information about an employee in the remote parse database and that retrieves and displays the data of an employee given his employee id.

ORAL QUESTION BANK

Assignment No I

Q.No.	Question	CO. No.
1.	What is Android Asset Packaging Tool?	I
2.	What is Android Debug Bridge?	I
3.	What are the basics tools used to develop an Android App?	I
4.	What are the advantages of Android?	I
5.	What devices are supported for Google play instant?	I
6.	Do developers need to build two different android apps?	I
7.	Can users choose to install the app permanently?	I
8.	How do permission work in Google play instant?	I
9.	Which permission are available to an instant app?	I
10.	What is the use of manifest file in Android Studio?	I
11.	What is the use of Emulator in Android?	I
12.	How to debug Android applications?	I

Assignment No II

Q. No.	Question	CO. No.
1.	List different UI screen components?	II
2.	What is the difference between an implicit & an explicit intent?	II
3.	When should you use a fragment, rather than an activity?	II
4.	You are replacing one fragment with one another –how do you ensure that user can return to the previous segment, by pressing the back button?	II
5.	How would you create a multi threaded android app without using thread class?	II
6.	What is a thread pool? and is it more effective than using several separate thread s?	II
7.	What is a relationship between the lifecycle of an Asyncktask & life cycle of an activity?	II
8.	What programming language is used for Android Apps?	II
9.	Why is UI important?	II
10.	List and Explain UI elements.	II
11.	What are the different UI controls provided by Android?	II
12.	How to create UI controls?	II

Assignment No III

Q. No.	Question	CO No.
1.	Explain what is SQLite?	III
2.	Explain what is SQLite transactions?	III
3.	List out the areas where SQLite works well?	III
4.	What is the difference between SQL and SQLite?	III
5.	Mention what are the SQLite storage classes?	III
6.	Mention what is the command used to create a database in SQLite?	III
7.	Mention what is the maximum size of a VARCHAR in SQLite?	III
8.	Explain how can you delete or add columns from an existing table in SQLite?	III
9.	Mention what is .dump command is used for?	III
10.	Explain how Boolean values in SQLITE are stored?	III
11	List out the standard SQLite commands?	III
12	List out the advantages of SQLite?	III

Assignment No IV

Q. No	Question	CO No.
1.	What is the Google map platform?	IV
	Which API do I need?	IV
2.	What countries does the Google map platform cover?	IV
3.	Can I put Google maps on my site without using Google map platform products?	IV
4.	How do I deliver maps applications on mobile devices?	IV
5.	What is the purpose of motion sensor?	IV
6.	What is a driveway motion detector?	IV
7.	Why is my motion sensor giving false detection?	IV
8.	Is there such things as a motion detector guard log?	IV
9.	Can pets trigger motion sensors?	IV
10.	What is the motion flood light?	IV
11.	Can I use motion sensor besides for security purpose?	IV

Assignment No V

Q. No.	Question	CO No.
1.	What is LDR?	IV
2.	How LDR works?	IV
3.	What is NTC & PTC?	IV
4.	What is the significant of NTC & PTC in real world?	IV
5.	How much money can you save when converting to LED?	IV
6.	Which LDR is suitable for automatic intensity control circuit?	IV
7.	Is it possible to install a LDR in a complicated circuit as the controller of the whole circuit?	IV
8.	What are the different applications of LDR?	IV
9.	What is the use of Arduino UNO board?	IV
10.	List the disadvantages of LED & LDR?	IV
11.	Explain the working of Arduino UNO board?	IV
12.	What are the technical specification of Arduino UNO board?	IV

Assignment No VI

Q.No.	Question	CO. No.
1.	Differentiate NodeMUC vs Arduino Uno?	II
2.	What is the purpose of Rx & Tx pin in NodeMUC?	II
3.	Is it possible to control 230V, 50Hz operated FAN? How?	II
4.	How relay operate?	II
5.	What is NodeMcu?	II
6.	List different pins of NodeMcu.	II
7.	Is NodeMcu a microcontroller?	II
8.	Explain the working of dc motor?	II
9.	Which factor determines the difference between the types of armature windings?	II
10.	Where is the armature located?	II
11.	What are the types of armature winding?	II
12.	What is mean by armature winding?	II

Assignment No VII

Q. No.	Question	CO. No.
1.	What is Open Source Hardware?	II
2.	How is open hardware different from other hardware?	II
3.	How is open source hardware different from open source software?	II
4.	What is NodeMcu?	II
5.	List different pins of NodeMcu.	II
6.	Is NodeMcu a microcontroller?	II
7.	What is NodeMcu ESP8266?	II
8.	What is the use of ESP8266?	II
9.	What is ESP in ESP8266?	II
10.	What is Actuator?	II
11.	What is the work of Actuator?	II
12.	What are the three types of Actuator?	II
13.	What is SERVO Motor and how does it work?	II
14.	How many types of SERVO Motors are there? Explain.	II
15.	What are the advantages of SERVO Motor?	II

Assignment No VIII

Q. No.	Question	CO No.
1.	What is Machine Learning?	VI
2.	What is the difference between supervised and unsupervised machine learning?	VI
3.	How to make a Machine Learning App?	VI
4.	List few Machine Learning applications.	VI
5.	How to apply Machine Learning to Android?	VI
6.	What are the different types of Machine Learning?	VI
7.	What are the basics of Machine Learning?	VI
8.	List few examples of Machine Learning.	VI
9.	How does Deep Learning differ from Machine Learning?	VI
10.	Explain Classification and Regression.	VI
11.	What is a Confusion Matrix?	VI
12.	What is the difference between Inductive and Deductive Learning?	VI

Assignment No IX

Q. No	Question	CO No.
1.	What is Android API?	II
2.	What is API used for?	II
3.	What is API level in Android?	II
4.	What is the use of API in Android?	II
5.	How many API's are there in Android?	II
6.	List few best API's for Android.	II
7.	What is the Google Maps Platform?	II
8.	Can I put Google Maps on my site without using Google Maps Platform products?	II
9.	How do I deliver Maps applications on mobile devices?	II
10.	What is an API and SDK?	II
11.	What are the different types of API?	II
12.	How do call an API from Android?	II

Assignment No X

Q. No.	Question	CO No.
1.	What is Wireless Network?	IV
2.	What are the types of Wireless Networks?	IV
3.	What is the difference between Wire and Wireless Network?	IV
4.	What is the difference between Wifi and Wireless?	IV
5.	What is Wireless router?	IV
6.	What are the pros and cons of Wireless Network?	IV
7.	What is the difference between WAN, LAN and PAN?	IV
8.	List few examples of Wireless Networks.	IV
9.	How Wireless network help in Data Communication?	IV
10.	What are the main components of Wireless Network?	IV
11.	How to protect Wireless Network?	IV
12.	List few security issues of Wireless Network.	IV

Assignment No XI

Q. No.	Question	CO No.
1.	What is the difference between Authentication and Authorization?	V

2.	How to enhance security in Android?	V
3.	What is Data Integrity?	V
4.	What is Confidentiality?	V
5.	What is Non Repudiation?	V
6.	How to secure Android phone?	V
7.	How to provide security in Android App?	V
8.	What is the difference between IOS and Android operating systems with respect to security?	V
9.	What is the best Security App for Android?	V
10.	Does Android have any built in security?	V
11.	What are the important key security features in Android?	V
12.	List few security threats in Android.	V

Assignment No XII

Q. No.	Question	CO No.
1.	How Frequency Hopping Is Used For Security In Bluetooth?	I
2.	Why Is Bluetooth 2.0 Better Than Previous Versions?	I
3.	What Do You Mean By The Term Frequency-hopping Spread Spectrum?	I
4.	What Is the Difference between 3g and 4g?	I
5.	What Are The Different Types Of Transmission Impairment?	I
6.	What Do You Mean By Network And SwitchingSubsystem?	I
7.	What Do You Mean By Base Station Subsystem?	I
8.	What Do You Mean By Mobile Station Subsystem?	I
9.	Explain The Concepts Of Digital Certificates	I
10.	What Is Point-to-point Tunneling Protocol?	I
11.	What Method Is Used For Voice Transfer? Brief About The Method Used?	I
12.	What Is Compulsory Tunnel and Voluntary Tunnel?	I
13.	What is the speed of 1g, 2g, 3g, 4g and 5g?	I
14.	Which country uses 7g network?	I
15.	What are 1g, 2g, 3g, 4g, 5g, 6g and 7g?	I
16.	What is Network Generation?	I
17.	What is Cellular Network and how it works?	I

ADDITIONAL RESOURCES

1. https://www.nodemcu.com/index_en.html
2. https://www.engineersgarage.com/article_page/sensors-different-types-of-sensors/
3. https://www.slideshare.net/MrSMAk/evaluation-of-cellular-network
4. https://developer.android.com/
5. https://circuitdigest.com/article/servo-motor-basics
6. https://www.tutorialspoint.com/android/android_sqlite_database.htm
7. https://www.tutorialspoint.com/android/android_studio.ht.